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Original Communications.

*THE TREATMENT OF AURAL PAIN.**

By Ralph W. Seiss, M.D.†

THE successful treatment of "earache" in its various forms will be admitted to be a very important matter by all general practitioners as well as otologists. Few diseased conditions are more common in children, and still fewer are accompanied by more distressing symptoms. Judging from his own experience, the writer believes that the therapeutic management of this group of affections is not very generally understood, and hopes that some practical suggestions as to treatment may be timely.

The causes of aural pain are many, and may arise in any portion of the auditory apparatus. Beginning with the auricle and external canal, *eczema*, *furuncles*, and *foreign bodies* are found to be the most common causes of earache originating in this region.

Eczema presents the same characteristics here as when occurring elsewhere in the body; the skin is swollen and much reddened, and there is a yellowish exudate, which coagulates in a dense yellow scab on

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the surface. The pain experienced by the patient is frequently quite severe, and is of a peculiar burning and itching character, often entirely preventing sleep for several nights. The diagnosis being established by inspection with the aural speculum and reflector, the following treatment will be found very satisfactory: The parts are first irrigated with warm water for several minutes by means of a suitable syringe, great care being taken not to bruise or irritate the inflamed skin. The surface then having been carefully dried by absorbent cotton, either a five per cent. ointment of ichthyol in vaseline, or of the yellow oxide of mercury, may be liberally applied over the irritated area, and allowed to remain. Great relief is usually experienced in a few hours; but, unfortunately, the disease has a strong inherent tendency to persist, and recurrent attacks may demand long and thorough constitutional treatment.

Furuncles of the external canal occur as localized or diffuse swellings, the former type being simply an ordinary boil, and the latter a traumatic or septic dermatitis. Both varieties are accompanied by intense pain, which may persist for several days, and which fails altogether to yield to hap-hazard treatment.

A circumscribed furuncle having been discovered by inspection, aided in some cases by careful probe pressure,—the boil being excessively sensitive to the lightest touch,—it is better in most cases to incise it freely at once. The aural paracentesis knife is the most elegant instrument for the purpose, but in dexterous hands the ordinary sharp tenotome of the pocket-cases is quite as satisfactory; in either case the mass is lanced freely to its base, and the canal then irrigated with warm water until the bleeding ceases. If pus has formed, it is the habit of the writer to "curette" the pyogenic cavity by means of a tightly-wound mop of antiseptic cotton on a sterilized applicator, all purulent surfaces being thoroughly rubbed. The surface is then dusted with iodoform, or one of its less odorous substitutes, and a light tuft of antiseptic cotton placed in the ear. Pain generally subsides at once, and does not usually return, unless another boil forms, to prevent which, constitutional tonic treatment should be commenced when the patient is first seen; strychnine, quinine, and coca-wine are the most generally useful drugs in such cases.

More diffuse or less active grades of inflammation of the canal yield rapidly in most cases to repeated applications of *black wash*, diluted one-half or more with water, or an ointment of the red oxide of mercury (gr. ii to 3i) may be employed. If the infiltration is extensive and the pain great, hot-water applications, containing about half a drachm to the ounce of laudanum, give great relief, a pad of absorbent cotton wet with the solution being placed at the meatus, and renewed as soon as cold. Brawny induration or pus-formation call for free incision, as suggested for the ordinary furuncle.

Foreign bodies, both animate and inanimate, are the immediate cause of a certain number of instances of aural pain. One of the worst cases of "earache" seen by the writer was found to be produced by a large bedbug resting on the drum and sucking blood from the manubrial plexus, the patient being nearly delirious from pain. Fleas and other insects occasionally enter the auditory canal and cause intense suffering by their movements; maggots are also at times deposited in a suppurating ear, and may even cause death. Cerumen plugs when tightly impacted, epithelial masses, and all sorts of objects introduced into the ear by accident or design may also cause otalgia of a very severe type.

The treatment of all forms of pain due to the presence of a foreign body in the ear of course consists in its removal, but much care and judgment must be exercised or the patient's sufferings will be increased instead of alleviated. The syringe is the most generally applicable, and the only entirely safe means of removing foreign bodies from the ear. A smoothly-working syringe and simple warm water should be employed, jet after jet being gently forced into the canal until the obstructing mass is removed. Various forms of forceps may be needed in a few cases, but their use should on no account be undertaken by any one not especially skilled in aural work, and in any hands their employment calls for great caution, injuries to the wall of the canal seriously adding to the existing irritation. Impacted foreign bodies are often better treated by warm irrigation, sedative ointments, etc., than by forcible efforts at removal, their extraction being easy after inflammation subsides.

The middle ear is the region most frequently diseased in patients applying for relief from aural pain, nearly all the inflammatory affections of the tympanum being accompanied by more or less acute suffering.

The acute earache of children is in nearly all cases dependent on myringitis and catarrhal inflammation of the middle ear, or

upon an acute Eustachian salpingitis. The clinical history of such attacks is well known to all practitioners. The child has a "cold," which may be so slight as to almost escape notice, and a few hours or days subsequent to its commencement develops aural pain, which soon becomes so severe that the little patient screams almost continuously. There is scarcely any other form of suffering in which the pain is so continuous and the cry so persistent, and a diagnosis can often be made simply from the history of the attack. In adults, the course of the disease is usually somewhat slower, but the painful stage may come on almost without warning, and cause the most unbearable agony in a few hours. The diagnosis is to be established by inspection with the speculum and reflector, as well as by examination of the naso-pharynx. The drum is found to be retracted and congested, usually in the upper segment, the hyperæmia varying in amount from a slight redness to intense engorgement and bulging. Inspection of the upper respiratory tract shows the usual appearances of acute coryza, pharyngitis, or tonsillitis.

Treatment is most satisfactory in these cases, especially in the earlier stages of the inflammatory process. The first indication is to relieve tension by opening the Eustachian tube. This can generally be accomplished by instilling 3 to 5 drops of a five per cent. solution of cocaine muriate into the *nostrils* of the affected side, and allowing it to trickle backward over the floor and lateral walls of the nasal chamber. A mild antiseptic nasal spray, such as Dobell's formula, should then be used to clear the nares of mucus, after which Politzer's inflation will usually open the Eustachian canal and immediately relieve the pain. About five minutes should be allowed to elapse between the instillation of cocaine and the use of the spray, and it is absolutely necessary that nasal congestion be relieved before using the inflation-bag to secure good results.

To prevent recurrence of tubal stenosis the most approved treatment of the causative coryza or pharyngitis should be carried out, and inflation repeated daily for a short period. Solutions or the vapor of menthol are probably the most useful agents at our command for controlling nasal congestion without injurious effects, and may be freely used. From 2 to 5 grains to the ounce of fluid albolene, combined with camphor, if desired, is a satisfactory method of using the medicine. Cocaine is altogether unsuited for *repeated* application, the secondary relaxation which it causes being decidedly deleterious, and sure to increase rather than allay the existing hyperæmia.

Paracentesis of the drum is almost never called for in acute myringitis and middle-ear catarrh, and although some relief occasionally follows its performance, the writer is convinced that the duration of the attack is lengthened and the chances of purulent otitis resulting are increased after its use. If performed at all, it should be undertaken only by the highly skilled and specially trained, the operation being one of great delicacy, particularly in the case of children with narrow external auditory canals.

Painful sensations of a dull and uncertain character are very common in *chronic* middle-ear, and are sometimes so severe in character as to call for the same treatment as the acute types. The therapeutic management of such cases includes the removal of the exciting causes in the naso-pharynx, systematic inflation and drum massage, applications through the Eustachian syringe catheter, and proper hygienic regulation, the subject being evidently too extensive to discuss in detail here.

Acute purulent otitis is accompanied by pain of the most pronounced and extreme character, the most serious cases of "earache" being due to this disease. The cause is a septic Eustachian salpingitis due to pyogenic bacteria, and occurring in the course of a purulent naso-pharyngitis of either acute or chronic type, the diseases most frequently causative of the condition being severe acute coryza, epidemic influenza, measles, diphtheria, scarlet fever, tonsillitis, atrophic rhinitis, and tuberculosis of the upper respiratory tract.

In addition to the pain, loss of hearing and marked tinnitus aurium are symptoms met with in nearly all cases of acute purulent otitis, in addition to the clinical signs of the causative disease. The diagnosis is to be made by direct examination of the aural fundus and the naso-pharynx: the tympanic membrane is found to be intensely hyperæmic, sodden, and so bulged and swollen that the normal landmarks are seldom visible, the drum resembling a piece of raw beef in some cases. Hemorrhagic blebs may occur in the external canal, especially in influenza cases, and shreds of necrosed (diphtheritic) epithelium sometimes block up its lumen. Perforation may have occurred, when muco-pus will be found exuding through a more or less

ragged orifice, and the canal may be so full of fluid as to require mopping before a diagnosis can be made. The naso pharynx shows the varying characteristic appearances of the causative disease, septic conditions being the only constant lesion.

Treatment must be prompt and energetic in cases of acute septic otitis, the disease being one dangerous to life, and dallying, palliative measures of no value but of much risk. In very mild cases, belonging more to the acute catarrhal than to the purulent type of middle-ear disease, the treatment recommended for the former disease will be found efficient, and should always be carried out even in the severest cases. But if extensive infiltration has occurred, the Eustachian tube cannot be freed, and drainage must take place through the external auditory canal. Hot irrigation of the aural fundus is a very valuable measure, and should always be tried, a *very gentle* stream of water as warm as can conveniently be borne being directed against the drum and walls of the canal for several minutes at a time. The ear should then be carefully dried and a *light* coat of boric acid blown over the congested membrane. If pain and high temperature continue, and the drum shows great congestion and bulging, paracentesis of the membrane is indicated, and, if the surgeon is familiar with the operation, should always be performed. The habit of the writer is to make the incision in the most bulged portion of the inferior quadrant, without observing any rules as to "the point of selection;" the utmost caution must be observed not to wound the promontory or the ossicles. Blood and pus usually issue from the cut as soon as the needle is withdrawn, but bloody serum is occasionally the only material found in the earlier stages of even septic cases. The warm syringing and boric acid insufflation should follow the paracentesis, as in uncomplicated cases, and treatment of the Eustachian tube and naso-pharynx must not be omitted. Morphine, hypodermically or otherwise, is indicated in all cases where local treatment fails to promptly relieve the pain, and constitutional sedative and supporting therapeusis is necessary in all cases, high temperature, and much systemic depression being constant symptoms of the disease. Prolonged and elaborate local treatment may be required for weeks after the painful stage has passed, and mastoid disease, and cerebral complications may present formidable symptoms for the consideration of the surgeon, the management of which cannot be described here.

Under the best treatment cases generally run a course of at least a fortnight, and the persistence of pain may justify a resort to opiates continuously for several days. But in most cases earache ceases as soon as drainage is established, and the subsequent course of the disease under good treatment is towards rapid recovery.

Severe attacks of aural pain are very frequent in cases of chronic purulent otorrhœa, and are often symptomatic of serious complications. A slight cold, or any temporary increase in the existing disease, may be accompanied by more or less acute suffering, or the earache may be due to such serious conditions as interference with drainage by masses of granulations or necrosed epithelium (*cholesteatoma*), or to periostitis or disease of the mastoid cells.

The treatment depends upon the cause, the removal of which is of the first importance. If the obstruction to drainage be due to accumulations of caseous pus, dead epithelium, or other *débris*, removal by means of warm water and the syringe will give prompt relief, unless complications have occurred. Granulations may call for immediate surgical removal, or if the proper instruments and the skill to use them are not at hand, warm antiseptic irrigation with carbolic acid (1 to 60), hydrogen dioxide (1 to 4), or boric acid (1 to 40), frequently proves sufficient. In either case the fundus should be subsequently lightly covered with finely-powdered boric acid, and the naso-pharynx must in all cases receive appropriate treatment.

Mastoid disease is in most cases due to interference with drainage, and the indications are always to allow free vent to the accumulated inflammatory products. This can be accomplished through the external canal in many cases by the method above described; if blush is apparent over the mastoid region, a blister of cantharidal collodion should be applied, and seems to sometimes abort the attack even after a marked degree of periostitis has occurred. When the region behind the auricle has become engorged and dougny, Wilde's incision is the safest means of preventing further mischief. The operation consists in making a short cut down *to* the outer surface of the mastoid, care being taken not to injure the posterior auricular artery. Pus or only bloody serum may flow from the incision, but in either case the relaxation of

tension is in most cases speedily followed by relief from pain, lowering of temperature, and general improvement. The cut may be lightly plugged with antiseptic gauze and covered with a moist dressing on general surgical principles. Rest in bed and supporting treatment are, of course, indicated, and irrigation, etc., through the auditory canal are even more important than before the incision was made. Actual opening of the mastoid cells is very rarely necessary, and the necessity for this operation is always a severe criticism on the earlier treatment of the case; its technique cannot be considered at this time.

Pure otalgia, or neuralgia of the ear, is one of the causes of aural pain, but is not of very frequent occurrence. The diagnosis depends on the absence of inflammatory lesions and the paroxysmal character of the suffering, also on the history of neuralgia in other parts of the face and head.

Treatment should be both local and constitutional. Chloroform used on a small flannel compress, held behind or in front of the auricle, often gives immediate comfort, and is a most valuable agent. Of course care must be taken not to blister the skin or anæsthetize the patient. The compress should be saturated and pressed firmly against the skin for only a minute or two at a time, being moved as soon as the burning becomes severe. Oil of peppermint, about the most ancient of neuralgia cures, is also a useful medicine in otalgia, and may be applied with a soft brush over the affected area. Hot, dry compresses are also grateful, and may be used in this as well as the painful inflammatory affections of the ear. Constitutionally the standard neuralgia drugs may be tried, and tonics, especially wine of coca and quinine, are nearly always indicated. Strict attention to hygienic measures are generally needed to complete a cure, nerve-tire and gout being the most usual ultimate causes of the disease.

A very common form of "earache" is due to dental caries, alveolar periostitis, or cementitis in pulpless ("dead") teeth, the pain being often referred only to the ear. The diagnosis is made by exclusion of aural causes and by examination of the mouth. Treatment, of course, must be relegated to the dentist, but temporary relief may be given by applications of tincture of aconite, or of oil of cloves to the cavity or to the gum about the tooth.

Accurate diagnosis is the first essential in treating aural as all other forms of pain, and the success of therapeutic measures will be in direct relation to the truthfulness of the interpretation of the conditions found, as well as to the thoroughness and manual skill of the surgeon.

BROMIDE OF ETHYL.

By E. E. Montgomery, M.D.*

No one practises surgery or obstetrics without appreciating the need of an anæsthetic for short operations, the examination of patients, and relief of the distressing symptoms attendant upon labor. Neither ether nor chloroform satisfactorily fill the requirements of such conditions; both anæsthetics require some time for their administration, are looked upon with anxiety by the patient, and have exceedingly unpleasant sequelæ. Their use consequently cannot be practised in the office of the physician with any hope of getting rid of the patient in a reasonable length of time.

Nitrous oxide requires too expensive and complicated an outfit to make it a satisfactory agent for such purposes. In the bromide of ethyl we have an agent which seems, in the experience of the writer, to meet all requirements in this special field. It has an exceedingly pleasant odor, in comparison with that of the other anæsthetics; the patients rapidly succumb to its influence; but small doses are required; it produces none of the unpleasant sensations of difficulty of breathing and feeling of suffocation. There is an absence of the stage of excitement or struggling, and anæsthesia is produced sufficient for ordinary slight operations and for many examinations before the patient is rendered unconscious. Thus the patient can obey the directions of the physician, change the position of the limbs or parts of the body, and yet not experience any pain, even when an abscess is incised or a wound probed.

The effects of the drug are exceedingly evanescent, the patient recovering consciousness even when thoroughly under its influence in less than a minute, and awakes from it as from a sleep, usually without any unpleasant effect. It is exceedingly rare for a patient to suffer from vomiting, which is a frequent sequel from the administration of ether. Its value in cases of labor is in that it can be administered with the onset of the pain, the patient, taking two or three deep

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inspirations, loses the sensation of pain, and yet is able to co-operate with the attendant in whatever may be desired.

In cases of confinement, my method of administration is to begin with the second stage of labor, using a Hawley inhaler, in the barrel of which the drug is placed. The patient holds it herself, and as soon as she has received a sufficient amount to render her unconscious, the inhaler drops from her hand. In this way the necessity of an assistant is dispensed with, and the patient is enabled to use the anæsthetic with the advent of each pain.

In several cases in which this anæsthetic has been given, the patient has held her limbs in position as directed during the application of forceps, co-operated by making expulsive efforts, and yet after the labor has been completed, she expressed herself as unaware of the birth of the child, and as having experienced no pain during its progress. It does not interfere with the muscular contraction of the uterus, is not so likely to be followed by inertia and post-partum hemorrhage, as would be the administration of chloroform.

I began the administration of this drug during the time it was in active use by Dr. Levis in this city, and have continued its administration in all obstetrical cases and for short operations and the examination of cases since that time. As I have used it in my hospital, as well as private, practice, I can safely claim to have administered it in nearly five hundred cases, and I have seen none in whom there seemed to be any dangerous symptoms attending its use; while nausea and vomiting are rare results of its administration, yet there are occasional cases in whom the use of the drug is attended with marked retching and vomiting.

Two cases to whom it had been administered for purposes of examination were unable to leave my office for several hours subsequently on account of this distressing symptom, but this occurred in not more than five out of as many hundred.

Another unpleasant result of its use is the exceedingly unpleasant garlic-like odor upon the breath of the patient, which continues, where it has been administered in a considerable quantity, for a couple of days after its use, thus demonstrating that the drug is eliminated largely through the lungs.

It seems singular that a drug of so much value should have been so quickly condemned by the profession upon the unfortunate result in two cases, one of which—that of Dr. Levis—was in such an enfeebled condition that the administration of any anæsthetic would have been attended with great danger. In his case, the practice of artificial respiration, which was done as soon as indication of arrested breathing occurred, resulted in the extrusion into the bronchial tubes of pus from the lungs, which at once rendered impossible further inspiration and oxidation.

A recent article in the *Therapeutische Monatshefte* for 1888 makes an extensive analysis of the reports of the use of this drug, and gives a mortality of but two cases, while Chisholm and Prince have administered it in several thousand patients, the former using it as a regular anæsthetic in all eye operations, and the latter preceding anæsthesia for major operations by the use of this drug, and thus recommends it for its value in obviating the unpleasant stage of excitement and struggling incident upon the use of the other and more permanent anæsthetics.

It has been recommended also in the dental profession as an anæsthetic far preferable to either ether or chloroform in the extraction of teeth. Dr. Diehl, in *Pittsburg Medical Review*, 1889, vol. iii., page 88, recommends it for dental purposes in preference to nitrous oxide in cases of heart- or lung-disease. While its effects are rapid, they are sufficiently durable to permit the extraction of teeth, and these may be removed even before the patient has lost consciousness. As reports have recently appeared in the columns of the GAZETTE from men who have observed its use, by others who have condemned it without any—or but little—experience, I have felt that, in justice to so valuable an agent, it is due to the profession to make this statement.

TURPENTINE IN TYPHOID FEVER.

BY H. C. WOOD, M.D.*

THE latest and in its clinical pathology the best book for a student in the English language, upon the practice of medicine, is that of Professor Osler. The fact that a man can say, as Professor Osler says, in one of his recent papers, that he has notes upon a thousand post-mortems of phthisis, dictated by himself, shows that he has approached the practice of medicine through pathology rather than through therapeutics, a fact which ought

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to be borne in mind by every student while reading the sections on therapeutics in Professor Osler's work.

On page 37 of the book, in the discussion of the treatment of typhoid fever, occur the following words: "For tympanites, with a dry tongue, turpentine was extensively used by the older Dublin physicians, and it was introduced into this country by the late George B. Wood. Unfortunately, it is of very little service in the severer cases, which too often resist all treatment. The routine administration of turpentine in all cases of typhoid fever is a useless practice, for the perpetuation of which, in this generation, H. C. Wood is largely responsible." So far as the personal element of this quotation is concerned, if I had belief in its truth, I would be greatly exalted in my own opinion, for how great must that man be who can lead astray without effort a whole generation of the ablest men of this continent. The fact that a book which is probably going to be *the* text-book for American medical students fails properly to explain the right use of turpentine in typhoid fever, is a sufficient excuse for the appearance of a brief article upon such an old subject, while the personal statements of the text are warrant for my writing such an article, and also for my detailing a personal experience.

When a young man I had an attack of typhoid fever, and was attended by Doctor (now Professor) Da Costa. During convalescence my recovery was prevented by recurring diarrhœa, with evidences of intestinal indigestion. One day my uncle, the late Professor George B. Wood, then an old man, came to see me. He said, "Neither thee nor Dr. Da Costa has read my book."* I replied, "I have certainly read it." "Thee has not read it to any advantage, then," was the reply, "or thee would know that just in thy condition I prescribe turpentine. The intestinal symptoms are due to ulceration, and turpentine will heal the ulcers." With the consent of Dr. Da Costa, I took turpentine, and the intestinal symptoms rapidly abated. For experimental purposes, the turpentine was stopped, and the intestinal symptoms reappeared, only to disappear again when the turpentine was taken afresh; and so I experimented time and again, until it became perfectly clear that the turpentine had a specific influence upon my intestinal condition. After this its constant administration was followed by steady progress towards health.

This personal anecdote clinically portrays what I believe to be an important practical fact,—namely, that when in the convalescence of typhoid fever, the existence of local intestinal symptoms points towards slowness of healing of the ulcers, turpentine is an invaluable remedy.

The second class of cases in which the value of turpentine has been asserted most positively by hundreds of clinicians of large experience, many of them men of the highest renown as therapeutists, is that in which marked tympanites, with dryness of the tongue, develops in the end of the second week of typhoid fever. Possibly it may be well at this point to quote the exact words of Dr. George B. Wood in his "Practice of Medicine:" "But there is a particular condition, and that a not uncommon and sometimes a very dangerous condition, in which I have very often employed it, and hitherto have very seldom known it to fail. In the description of the symptoms, it was stated that, in the latter period of the disease, the tongue, instead of cleaning gradually from the edges and tip, often parts with its fur quickly and in large flakes, generally first from the middle or back part of the surface, which is left smooth and glossy, as if deprived of its papillæ. It was also stated that if, after this process, the tongue remains moist, a slow convalescence may be pretty confidently calculated on. But it not unfrequently happens that, during the progress of the cleaning process, or after its completion, the surface of the tongue becomes quite dry, and the process, if not finished, is suspended. At the same time there is generally an increase of the tympanites, and an aggravation, or certainly no abatement, of the other symptoms." Dr. George B. Wood believed that the action of turpentine in these cases was a local one exerted upon the ulcerated surface, and gave good reasons for his belief. I have no doubt myself of the correctness of this theory.

Any one conversant with the literature of the subject must recognize that a great number of clinicians have endeavored in various ways to get in typhoid fever a local action upon the ulcerated surface of the intestines; for example, nitrate of silver has been largely employed and much lauded by Professor Pepper. The difficulty is that it is not possible to get most of these alterative substances in contact with the ulcers; thus, the alkalies of

* In his immediate family, Dr. George B. Wood always used the Quaker dialect.

the saliva, the chlorides and organic matter in the stomach, and the alkalies of the intestinal juices must utterly destroy the quarter, or even half, of a grain of nitrate of silver before it can get through even the duodenum. Terebinthinates are, however, slowly absorbed, and are, moreover, volatilized at the temperature of the stomach and intestines. When turpentine is freely and systematically given, it must as turpentine reach the small intestine, and must also fill with its vapors all the intra-intestinal spaces. The effects of terebinthinates upon ulceration is well known, and if credit is to be given to laboratory researches, there would seem to be a special relation between the oil of turpentine and the bacillus of typhoid fever. In a work which received the gold medal from the medical faculty of Kiew, Theodore Omelchenko detailed, among other things, the results which he arrived at in experiments with the bacillus of typhoid fever. He found that if the air were saturated with the vapors of turpentine and certain allied substances, the bacillus of the typhoid was destroyed, while a moderate amount of the turpentine vapor was able to arrest the development of the bacillus. It is true that he found certain other substances, especially thymol, more powerful than oil of turpentine; but the question in the past has not been between oil of turpentine and these substances, but as to the value of the oil of turpentine. It may be that in the future thymol will be found more active than turpentine; it is, however, much less volatile than turpentine; and, although volatilized thymol may be more active than the turpentine as a bacillicide, yet under the conditions found in the intestinal tract, the greater volatility of turpentine may make it practically the more efficient in destroying disease-germs.

Too much importance must not, however, be attached to these laboratory experiments, which, at best, only afford an explanation of the clinical results. The survival of the use of turpentine in typhoid fever, through more than half a century, in spite of attacks upon it like this of Professor Osler, demonstrates the vitality of the practice, and proves that it cannot be dependent upon the favor or exertions of any one man or group of men.

Believing, as I do, that turpentine acts locally; that in all cases of typhoid fever ulceration exists; that properly administered the drug is incapable of doing harm, I am in the habit of giving towards the close of the second week of typhoid fever turpentine, without looking for special indications, and, as the result of an experience of considerably over a quarter of a century, I believe the practice to be a good one, and that the use of turpentine does distinctly tend to lessen the severity of the local lesions in enteric fever.

In closing this brief paper, may I call attention to the powers of glycerin in disguising the taste of turpentine, and give the following formula:

℞ Ol. terebinthinæ, ʒii;
Glycerinæ, ʒi;
Mucil. acaciæ, ʒiss;
Aquæ menthæ piperitæ, q.s. ad ʒviii. M.

Sig.—Tablespoonful every four hours during the day. Shake well.

SULPHATE OF SPARTEINE AS A REMEDY FOR TREMORS.

By Chas. S. Potts, M.D.*

In reporting the following cases of tremors from various causes, relieved by the use of sulphate of sparteine, I am aware that the cases are not numerous enough, nor the period of trial long enough, to afford positive evidence as to the value of this drug for this purpose, but as it certainly seems to have been of service in my hands, I give the results of my observations thus far to the profession, with the hope that others who come in contact with similar cases may be led to give the drug a trial, and thus complete the mass of evidence necessary to determine its therapeutic value. The history of the first case in which the drug was employed is as follows:

J. A., aged 73, a loom-boss, presented himself at the University Hospital, with the history that for several years he had been troubled with a tremor of both hands. This ceased for a while at times, and was not increased by muscular exertion. Two years ago he had "a stroke of paralysis," and the tremor has been much worse since that time. He is also short of breath; is unable to sleep in a recumbent position; his feet swell at times; he has a poor appetite and suffers from nausea after eating. Dr. Wm. Evans, my colleague in the dispensary, who first saw the case, made the following notes of his condition at the time of the first visit,—viz.:

Fine tremors in both hands; no paralysis anywhere noted; knee-jerks decreased. The pulse is 90; the arteries are hard, and marked

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venous congestion of the face is present. Physical examination of the heart showed a loud diastolic murmur at the aortic cartilage. Dr. Evans prescribed a tonic of arsenic, strychnine, and dilute muriatic acid, and in addition sulphate of sparteine, gr. ¼ t. i. d. The sparteine was given to improve the condition of the heart, and therefore the discovery of its action upon the tremors was accidental. The man returned in five days, and reported that "he had passed the best week for two years." The heart was more regular in its action, and while there was some tremor noted, it had improved. Our attention was not especially directed to the improvement in the tremor, however, until his next visit, a month later, during which he said that, after taking the sparteine, the tremor always ceased entirely for some time. At the next visit the tremors had almost entirely ceased, the medicine in the mean time having been increased to gr. ½ t. i. d. At this visit the sparteine was stopped, and the tonic before mentioned continued. At the end of a week he returned with the tremors as bad as ever. The sparteine was then again added to the treatment, with the result that the tremor again disappeared. When last seen, some three months ago, it had not returned. This patient was under observation six months. Incidentally, it may be mentioned that he had been treated by numerous physicians for this tremor, without having ever before obtained any relief.

Case II.—G. T., aged 32, by occupation a carpenter, presented himself at the dispensary with violent tremors of both hands, which he says have persisted since he was eight years of age. The tremors become worse after working hard, or whenever he has headache, from which he suffers a great deal, the pain involving the entire head. He is very easily excited or worried; tongue tremulous; no heart lesion. Sulphate of sparteine, gr. ¼ t. i. d., was prescribed, with the result that three days later he reported that both the headache and tremor were much improved. The sparteine was increased to gr. ½ t. i. d., and in ten days he returned with a history of continued improvement. The sparteine was then stopped, and a tonic of arsenic and strychnine substituted. At his next visit, five days later, he reported himself much worse, the headache having returned, and the tremor being aggravated. The original treatment was then returned to, but, as he discontinued his visits, with what result is not known.

Case III.—P. K., a stone-mason, aged 53; in addition to ptosis of the left eye and other symptoms of cerebral syphilis, from which he was suffering, had a severe tremor of both hands; increased after muscular exertion. Under specific treatment of two months' duration, all of his symptoms improved, except the tremor. Sparteine was then added to the treatment, and immediate improvement followed. This has continued for one month, and he is at present taking gr. ½ t. i. d., with the result that "his hands are better than they have ever been."

Three other cases of tremor associated with neurasthenia were placed upon the drug, in connection with a general tonic treatment, so that it is, of course, impossible to say just how much of the improvement which ensued was due to the use of this remedy, although it seemed more rapid than that which took place in similar cases treated without it.

Through the kindness of Dr. F. X. Dercum, a number of cases were also placed upon it in the Philadelphia Hospital; but, through the changing of internes or some other cause, complete records of the results were not kept. I was, however, able to find four cases, two of old hemiplegics, one of locomotor ataxia, and another of meningitis, following sunstroke, in all of whom tremors were present, and who had been much improved while taking the drug. One case of paralysis agitans, of very long standing, was also treated, but without benefit. No opportunity to try it in the earlier stages of that disorder has been afforded since the drug has been under trial.

The physiological action of the drug explains, I think, its action in these cases in addition to its action as a cardiac tonic; it also acts as a depresso-motor. Wood,* in summing up the physiological properties of the drug, says that it acts powerfully upon the cerebral and spinal centres as a depressant. Hare,† likewise, says that in large doses it depresses the brain and cord, chiefly in the motor tracts, causing decrease of reflex action and motor power. It is also possible that in the senile and neurasthenic cases, with weak hearts, that part of its action may be due to stimulating that organ, and hence improving the circulation. It will be noted that in Case II. the headache was also improved by the use of the drug. We often come in contact with cases in which bromides are indicated, but, on account of weak cardiac ac-

* "System of Therapeutics," 7th edition, p. 381.
† "Practical Therapeutics," p. 281.

tion, are unsafe. It seems to me that further trial may prove sparteine to be a drug of value in such cases.

ANÆSTHESIA.

SOME PRACTICAL SUGGESTIONS FOR THE GUIDANCE OF THOSE WHO ADMINISTER ANÆSTHETICS, AND FOR THOSE WHO HAVE ANÆSTHETICS ADMINISTERED.

By W. M. L. Coplin, M.D.*

HAVING administered anæsthetics in the clinic of the Jefferson Medical College Hospital, and to the private patients of many of the attending surgeons and gynæcologists, and in private practice, for a period of over five years, the writer feels that he can speak with some confidence upon the principal points connected with the induction of anæsthesia. The number of times which I have administered anæsthetics, including both chloroform and ether, amounts to nearly three thousand. I have never met with a fatal accident, and have never seen death during the administration of the anæsthetic, or within such a reasonable time after its administration as to lead me to infer that the anæsthetic was the immediate cause. I have given it to patients of all ages. In an infant but a few hours old, with congenital absence of the anterior abdominal wall, by direction of Dr. Hearn and myself, the interne administered ether without any unhappy effect; and in a lady 92 years of age, a patient of Dr. Barton, with multiple epitheliomata on the face, I gave ether without any apparent danger. In the former case the quantity of ether was two ounces; in the latter case, four and one-half drachms; the operation in both cases lasting about one-half hour. I administered chloroform, for Professor Keen, to a man who, to the best of my memory, was between 55 and 60 years of age. The operation (suprapubic cystotomy) lasted eighty-five minutes, and the man took nineteen ounces of chloroform; this is the largest quantity of chloroform that I have ever administered. He showed no bad effects, and made, I believe, an uninterrupted recovery. As to the length of time, I have, as has every anæsthetizer, given ether many times to primary anæsthesia, and have never seen any difficulty whatever. Assisted by Dr. Sweet, during the service of the late Professor S. W. Gross, we kept a man continuously under ether, for digital oppression of the femoral artery, for thirteen hours, without any evidence of very much shock, either circulatory or nervous. I gave ether to a patient suffering from consumption the morning following a severe pulmonary hemorrhage. I have given it in cases of Bright's disease, in both the large white and contracting kidney, and although there have been many discussions as to ether producing suppression of urine, I beg to place myself among those who doubt the probabilities of such being the case. Most of these cases, if gone into, and I have observed several, are cases where operations have been performed involving the genito-urinary tract, and I would respectfully call the attention of the believers in this theory to the fact that the very smallest possible operation upon these organs, such as circumcision, slitting of the external meatus and similar processes, have proven fatal, even after the use of cocaine, and without any other anæsthetic. Indeed, in one case related to the writer by the late Professor S. W. Gross, death occurred without the use of any anæsthetic whatever.

Suppression of the urine is a process not infrequently associated with disturbances of the nervous system, entirely at variance with those induced by anæsthesia. That this is exclusively the case, I am not prepared to state.

The relation between cardiac diseases and the propriety of administering anæsthetics is one also open to discussion by the profession, but most prominently by members of the laity. I have given anæsthetics in nearly all stages of so-called heart-disease, including valvular lesions, both old and comparatively recent, also in the various forms of stenosis, in angina pectoris, and in all those varying functional disturbances characterized by perversion of rhythm.† I do not recall any case where I have reason to regret it. I have found, as a rule, however, that where the circulation is sluggish, the anæsthetic is rapidly effective, and is not infrequently followed by prolonged post-anæsthesia shock. Furthermore, in those cases where there is an extremely active condition of the circulation, either alone or associated with hypertrophic conditions in the heart-muscle itself, the anæsthesia is not uncommonly followed by

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† No anæsthetic should be used in cases of fatty heart.

the most marked and prolonged stage of post-anæsthesia excitement. Drunkards, or tipplers of any character, are difficult to anæsthetize, having a prolonged stage of primary excitement, which yields slowly and with difficulty, rigidity being in many cases a prominent feature throughout a long operation. Indeed, I have seen cases in which absolute relaxation was only to be attained by placing the patient in imminent danger. Usually it will be found in these cases that if the anæsthesia be begun by chloroform and terminated by ether, it will be more speedy, more safe, and followed by less disturbances than if either of the agents be used alone. In these cases, as also in cases where there is long-standing chronic bronchial catarrh, I have found that the administration, hypodermically, of morphine sulphate, gr. ¼, atropine sulphate, gr. $\frac{1}{100}$, immediately before the beginning of the anæsthetic, has greatly facilitated the process, and rendered the after-symptoms less prominent. As a rule, it will be found that operations involving the genito-urinary, anal, or rectal organs, require a much more profound anæsthesia than in general operative procedures. In these cases the anæsthetizer is not infrequently confused by an impatient operator, which is evidence that the operator himself is not competent, for, all other things being equal, the anæsthetizer will use every effort to maintain as complete a degree of anæsthesia as will be compatible with safety. As he is entirely responsible for that portion of the operation, he should be allowed, if he is competent,—and I take it for granted that no surgeon of repute will call upon any incompetent person to administer an anæsthetic except in emergency,—the fullest liberty as to the quantity of the anæsthetic which he is to use and the proper method of its administration. The surgeon who gives direction to the anæsthetizer to use more ether or more chloroform, as the case may be, assumes immediately the responsibility of the anæsthetic, and should be held entirely in case of accident depending upon faulty administration. It becomes the duty of the anæsthetizer in such a case to do exactly as the operator directs, and I for one believe, and should be willing to state before any court of justice, that the operator, be he whom he may, has exceeded his authority in directing the use of the anæsthetic. This is a great difficulty, which one may have to meet in the administration of ether, and it is one in which I am sure there is no rule that will apply better than the above. Let the operator feel distinctly the responsibility in the administration of the anæsthetic, and, if he desires to direct it in that case, the anæsthetizer becomes merely a piece of apparatus by which sufficient doses are mechanically used, at the will of the operator, who, nine times out of ten, does not at all realize the condition of the patient. While this is the case, there is also another aspect to be considered,—namely, the position of the surgeon may be such that he can see conditions not readily to be observed by the anæsthetizer; for example, the operator can more readily discern faulty oxidation of the blood, as manifested by the change in color and the alterations of the arterial redness to venous blueness, and of venous blueness to blackness, the normal color of the blood even becoming almost an intense black. This condition may be instantaneous in its development, and, as in the field in which the operator is working, the blood-vessels are exposed, as well as the blood flowing freely, the change of color will be more prominent, and develop more quickly than in the face or hands, where the thickened skin precludes the rapid exhibition of the change. This is especially true in colored people. Many times have I had occasion to observe cyanosis manifested at the field of operation, while naturally, of course, the process would be scarcely discernible upon the countenance of the patient. When the tongue cannot be seen, the best information may be gained in the colored race by a rapid inspection of the gums and mucous membrane of the lips, the latter being everted for the purpose. Of course, if access can be had to the tongue, it will, in many instances, reveal immediately any alteration in color.

We now come to the consideration of the anæsthetizer. There is a decided tendency among the older members of the profession to have a medical student administer the anæsthetic, or it may be a young graduate who is called upon to assume the responsibility. For my part, were I to undergo an operation of any gravity, an operation which is likely to engross the time and attention of the operator, to involve close attention or demand concentration of thought, I should prefer that the student do the operation and that the surgeon administer the anæsthetic. In all other remedial measures, accidents and idiosyncrasies that may be peculiar to the individual have rendered the profession more careful and more conservative. In anæsthesia, the evidence gained and the wonderful results manifested by its induc-

tion, with the comparative absence of danger, has made the operator careless, and he hence selects, in many instances, individuals who are themselves not experienced. I should like to ask the inexperienced anæsthetizer, before he voluntarily accepts the situation, whether he is willing to abide by the dangers of cerebral hemorrhages, intense shock, heart-failure, occlusion of the glottis by foreign bodies, such as vomited matter or spasm of the glottis, or the falling backward of the tongue, or paralysis of the heart or respiration, etc. Each and all of these I should like to call to his attention before he assumes the responsibility of administering the anæsthetic. Having decided to administer the anæsthetic, there are certain things upon which he must inform himself before he begins. 1. Is his anæsthetic pure? Commercial articles are under no circumstances to be used. The term "commercial" is here used in the sense recognized in the Pharmacopœia. For my part, while not wishing to forward the interest of any individual, I have strictly adhered to the use of the chloroform and ether manufactured by Edward R. Squibb, of Brooklyn, N. Y. I order this in the can, to be unopened, and if, therefore, the anæsthetic be impure, or any difficulty arises from that source, the responsibility is shifted, and the knowledge that one of the best articles in the market has been used relieves the anæsthetizer of any blame from that point. After opening a can of ether, a peculiar odor may occasionally be observed, the characteristics of which it is impossible to describe. I have found this odor to be constantly associated with ether which has aged, and have in several cases traced it to the fact that it had lain on the druggist's shelves for some time. I have never seen any dangerous symptoms arise during the administration of such ether, but the patients have invariably complained of an extremely prolonged nausea and bad taste remaining in the mouth for many hours, even, in some cases, days. In the administration of such ether I know that these conditions actually occur, as I have taken it to the point of actual unconsciousness, and have myself suffered from the most intense disagreeable nausea, coming on immediately, and lingering for many hours after all other evidence of the anæsthetic had passed away. Having assured himself of the pureness of the anæsthetic, the anæsthetizer should secure for himself one or two towels, should have a hypodermic syringe in readiness, charged with one-twenty-fourth of a grain of strychnine, with more strychnine at hand in a convenient form. He should also have in readiness a solution of atropine, in which each hypodermic syringeful represents one-sixtieth of a grain. It would be a matter of individual taste with the operator whether he have also at hand aromatic spirits of ammonia, whiskey, tincture of digitalis, or preferably digitalin. The latter is most conveniently kept in the form of tablets, one-hundredth of a grain, one of which should be in solution and ready for use. Dr. Hearn, senior surgeon of the hospital staff of the Jefferson Medical College Hospital, who administered anæsthetics for many years for the elder Gross, assures me that he has very rarely found any instrument other than the hypodermic syringe of any use during the administration of anæsthetics. It has, however, been my habit, under the direction of Professor W. W. Keen, to supply myself with a mouth-gag and with tongue forceps. These I have on several occasions found useful, and am willing to testify to their having in several instances relieved my anxiety in a case. The use of the battery, either galvanic or faradic current, has in some cases been found beneficial. I suppose that in desperate cases the anæsthetizer may have a battery convenient, although I should never think him open to criticism if he did not have one. Personally, I have never had occasion to use one, and question very much if artificial respiration does not offer a much more certain means for securing resuscitation than does the galvanic or faradic battery.

As to the mode of administering the anæsthetic: for several years I gave it upon a towel rolled up in the shape of a cone. I am convinced, however, that, as compared with the Allis inhaler, the towel is a barbarous, unscientific, nay, I might say, dangerous method for the administration of an anæsthetic. The belief among the inexperienced that it secures economy is erroneous and founded upon faulty conception of facts. I am personally convinced that with the Allis inhaler, in proper hands, a minimum amount of the anæsthetic will be used.

The anæsthetizer now being in readiness, certain preparations are to be considered in connection with the patient. He should have had no food for at least twelve hours, except clear bouillon or beef-tea. Milk and similar preparations I would under all circumstances, except in the most weak, prohibit. Even then I think it advisable, where there be great emaciation, or where there be apprehended a very intense degree of shock,

that there be administered, at least two hours previous to the operation, an enema of peptonized milk, or peptonized egg and milk, in which, if deemed necessary, some stimulant may be introduced. In these weak and debilitated individuals, I would most warmly recommend that administration of morphine and atropine as advised above. The anæsthetizer should personally *inspect* the mouth, including the teeth, tonsils, and fauces of the patient, before beginning the administration of the anæsthetic. This would exclude any foreign bodies in the mouth, and would inform him of any abnormity existing in any of the structures of the mouth and the visible portion of the throat. He should, if possible, engage the patient in conversation of a word or so, in order, as it were, to feel the tension of the nervous system, and, if the patient be very nervous, as evinced by the voice and character of the speech, he should offer assurance and encouragement, in a frank, open manner, without any hesitation, which in no small number of instances, will be taken by the patient as a suggestion to render them brave, and thus alarm them. The anæsthetizer should make an examination of the heart, should count the respiration and the number of heart-beats. True, it may be said, that this is of little use, as the patient will be intensely excited, and the cardiac condition one in which we cannot draw any definite conclusion. However, I have, I am sure, gained much information by making this an invariable rule. It is preferable, of course, when feasible, to obtain a knowledge of the heart condition some time previous to the excitement of the proposed operation. This, of course, is not in many instances to be accomplished. All head jewelry, such as ear-rings and combs and hair-pins, should be removed before the beginning of the anæsthetic. The writer has on several occasions scratched his hand upon the head adornments of the opposite sex, and has known ear-rings to be torn out by a struggling patient. I never trust the statement of any one that the mouth is empty. I recall on one occasion asking a woman if she had false teeth. She assured me to the contrary, and still during the operation I removed a full upper and lower set, and had her wig drop off in my hand. These are little vanities that can be overcome through a personal inspection by the anæsthetizer, without putting a woman's vanity or a man's conceit to any test whatever. I have known an anæsthetizer to start ether in a child which had a safety-pin in its mouth. I can readily conceive of a loose tooth, during the process of second dentition, becoming displaced by the use of a mouth-gag, and the very knowledge of the possibility would render the anæsthetizer awake to the danger. All tight clothing should be removed or loosened. And here, again, I do not trust either the nurse or patient. Women do not know when their clothes are tight. Their physical education has been such as to adapt themselves to uncomfortable garments, without being aware of it. I am equally suspicious of all bandages around the head and neck, circular turns of the neck, Barton's bandage, Gibson's bandage, and any other retentive apparatus, utilized for keeping dressings on the head or neck. If it be absolutely necessary that an antiseptic dressing remain on the neck, I see that there is within easy reach a heavy pair of bandage-scissors, with which I can remove the bandage upon the slightest indication of any impediment to the respiration or circulation. It will be found convenient in women who have their hair in large masses about the head to have it covered either by an antiseptic towel, as advised by Professor Keen, or have a bathing-cap worn. The latter is preferable, as it precludes the possibility of vomited matter or blood getting into the hair, and thus rendering the patient uncomfortable for hours, or even days, after the operation. I also make it a point to locate, before I begin the anæsthetic, some of the prominent blood-vessels of the head and face ; for example, the facial artery, as it passes over the body of the lower jaw, or the temporal artery just above the zygoma, and in some cases the carotid artery may be of some use to you. I get the landmarks of all these blood-vessels before I begin the anæsthetic, and I assume in my mind their volume and the strength of the beat, as manifested by the size of the artery. I rarely have recourse to the radial, but, if such be necessary, I should locate it before the operation begins.

Having made these preparations, we are now ready to begin the administration of the anæsthetic. The administration of the anæsthetic is preferably begun by allowing the patient to breathe for a moment or two through the uncharged inhaler. I then begin by adding drop after drop of the anæsthetic, gradually increasing the amount until anæsthesia is secured. If primary anæsthesia is all that is desired, there need be little difficulty in pushing the anæsthetic with comparative rapidity, requiring the patient to hold up one hand to the full length of the arm ; the arm

will probably waver or drop one or two times before the primary stage of anæsthesia is reached. This can be told by calling to the patient sharply, "Raise up your arm." If he fails to respond, the operator may safely presume that he is in the first stage of anæsthesia. This stage, of course, is found almost exclusively in ether anæsthesia; recourse is never had to it in chloroform narcosis.

Properly speaking, the stages of anæsthesia may be divided as follows: 1. There is a stage of primary excitement dependent largely upon the nervous condition of the patient. In ether this is followed by primary anæsthesia, which is followed in all anæsthetics by the secondary stage of excitement. The primary and secondary stages of excitement may be apparently continuous, the stage of primary anæsthesia being not at all well marked between them. During the stage of excitement the respiration is usually carried on rapidly, the face becomes flushed, the eyes staring, and pulse bounding. There is rigidity of the general muscular apparatus; the nostrils dilate with each inspiration; the thoracic and abdominal respiratory muscles are acting to their highest degree. As a rule, in alcoholics and in those of nervous temperament, we have an active delirium which may be fierce, but in no small number of cases resembling that form of psychical disturbances considered by the older writers as delirium nervosum. Rarely will this be present in the sober and temperate individual, nor in women, except it be a manifestation of hysteria. During this stage not uncommonly the respiratory muscles become fixed, the tongue falls back into the fauces and partially excludes the entrance of air, or, as I am perfectly convinced, it may be drawn back by spasm of the muscles situated at its base. The patient may become cyanotic, eyes bulging, lips blue, finger-nails blue, the respiratory efforts either locked in full inspiration or expiration, usually in full inspiration. These cases are occasionally of sufficient severity to give rise to uneasiness on the part of the anæsthetizer. If, however, this active stage be pushed with sufficient rapidity, there is little reason to fear further complication. In this condition, it may be found necessary, if the tongue is drawn back, the respiration seriously impeded, to open the mouth and pull the tongue forward, at the same time extending the head. I have, however, found that by far the most successful way to overcome this stage was by the administration of a few drops of chloroform, for it occurs most frequently in ether anæsthesia, the former relieving the spasm and rapidly bringing on the third stage or complete unconsciousness. The novice will not infrequently find himself at some difficulty in deciding, when the patient is safely anæsthetized, the earliest indications of approaching anæsthesia are those which will be elicited by tickling the patient, who early does not respond. Next to this probably will come the disappearances of the reflexes elicited by passing the finger gently over the eyelashes (the palpebral reflexes), and lastly the conjunctival reflexes disappear,—that is, if the conjunctiva be touched by the tip of the finger, the patient no longer makes any effort to close the eye. These almost invariably precede stertorous breathing, and are usually very closely associated with relaxation of the general voluntary muscular system. If an arm or leg be raised, and let drop, it falls as though the patient were dead. When the anæsthesia has reached this stage, anything further is bordering on the edge of danger, and should only be exceeded when, after the operation is begun, the patient manifests marked resistance. This will not infrequently be the case in operations upon the genito-urinary and anal regions. Following the last, or complete anæsthesia, there is a fourth stage,—namely, the one in which consciousness slowly returns. In this we have not infrequently a delirium or condition of excitement very closely resembling that observed during the administration of the anæsthetic. During this stage the pulse usually sinks, the face becomes pale, the pupil dilates, and these symptoms usually precede what almost invariably occurs in ether anæsthesia, vomiting. I am thoroughly convinced that vomiting after anæsthesia is dependent upon three things,—first, the character and quality of the anæsthetic used; second, the condition of the nervous system of the patient; and third, the method by which the anæsthetic is administered. I believe that if the anæsthetic be properly administered, vomiting will rarely ensue, provided the patient has been appropriately prepared for the anæsthesia. I do not claim, however, to be able under all circumstances to so administer the anæsthetic as to prevent vomiting. I believe that vomiting is largely due to the swallowing of large quantities of mucus, which is formed during the stage of excitement, and that whatever tends to prevent the formation of such mucus, or to prevent its being swallowed, almost invariably tends to diminish the vomiting. Thus, a hypodermic injection of morphine and

atropine seems to give important assistance, as will also the spraying out of the throat with cocaine, in the strength of about two grains to the ounce of water, just prior to beginning of the anæsthetic. The latter I have found exceedingly useful in one or two cases where I have tried it. The dangers from anæsthesia may be perfectly summed up in two,—failure of the respiration and failure of the circulation. Failure of the respiration occurs in two ways, one of which might be more properly considered as an impeded or obstructed respiration; for example, the tongue falls backward into the throat, or a foreign body occludes the trachea. In either of which cases the respiration would be impeded and rendered impossible in a mechanical manner. This is to be remedied, of course, by the removal of the cause. I have over and over again observed the anæsthetizer, under such circumstances, press the chin down upon the trachea; in other words, flex the head, which in ninety-nine times out of one hundred intensifies the respiratory impediment. The head should be well extended; the mouth opened, and the tongue drawn forward; all weight of hands and arms removed from the chest and abdomen. Cold water may be dashed in the face, or the patient struck by a sharp blow on the face or chest with the fringe of a towel which has been wet in cold water, preferably ice-water. If the obstruction be a foreign body in the trachea, it must immediately be removed. Thus, if mucus or blood have gained ingress, the patient should be turned upon the face, with the head and chest well over the edge of the table. Artificial respiration in these cases has never in my hands given any flattering results; in fact, I rarely resort to it any more. It is to be reserved for that form of respiratory failure where the respiration gradually and slowly lags, becomes slower and slower in speed, and eventually stops, or where there be a sudden failure of respiration, without any mechanical interference whatever. I believe that this distinction should be sharply drawn between respiratory failure and impeded respiration. As already intimated, impeded respiration occurs, for the most part, in the secondary stage, and respiratory failure, properly so called, belongs to the stage of complete anæsthesia or the post-anæsthesia stage. Where the respiration is slow, shallow, or shallow alternating into deep long drawn sighs, strychnine and atropine, either alone or combined, will be found useful. The application of external warmth is not sufficiently credited in the treatment of either circulatory or respiratory shock. Where the abdomen is opened, flushing with very hot water will almost immediately stimulate both cardiac and respiratory sluggishness. Theoretically, the abdomen should not be filled, as that would press upward on the diaphragm and impede the breathing. Accumulation of the mucus is most likely to occur in the first stage, as, after the anæsthesia becomes complete, the mucous membrane is less likely to secrete an excess of mucus.

Finally, there is one condition to be constantly borne in mind; it stands pre-eminent above all others in the administration of an anæsthetic. *The man who gives an anæsthetic should do that and absolutely nothing else.* He cannot see the operation; he cannot look at anything except his patient; he should have time for nothing besides this one thing. If the anæsthetizer is found observing other things besides that for which he is chiefly selected, there can be no pardonable excuse for allowing him to retain his responsible position. Respiration must always be under his immediate observation, sight, and hearing, both engrossed in watching and listening for impeded breathing or change in color, and he has no time whatever to devote to anything else which may be going on around him. It is to be regretted that he is often looked upon as having what is known in popular parlance as a "soft snap;" and not infrequently an on-looker, or an individual who is playing the part of spectator, attempts to engage him in conversation or perpetrate some petty joke. These are but exhibitions of ignorance, and unappreciation of the responsibility under which the anæsthetizer is laboring. As he is working hard and ardently engaged, any annoyance or interruption by an outsider is to be promptly and courteously but firmly ignored, or at times resented and rebuked. He should appreciate having his attention called to anything which may bear upon the welfare of his patient, but he should always blush when such negligence on his part has been detected by outsiders.

THE COMPARATIVE THERAPEUTIC VALUE OF MASSAGE.

By A. J. Baker, M.D., Denver, Col.

IT may be easy to decide what will be the probable therapeutic value of any remedy in a given case; but it will be vastly more difficult to decide what its *comparative* therapeu-

tic value may be, balanced against all other known remedies. This may be particularly difficult with massage, as it differs so widely from every other remedy. Yet, it appears to me, the most practical way of considering any remedy is to study it, as we will have to decide its value at the bedside. This plan may lead us into difficulties far beyond our ability to solve, and the reader may be greatly disappointed with my presentation of the subject.

I understand massage to be a scientific mode of treatment, best performed by the hands upon the accessible tissues and organs of the body; and that it consists principally of friction, kneading, manipulation, rolling, and percussion in a variety of ways, with a hygienic, palliative, or curative object in view. I much prefer this nomenclature* to that of the French in common use, as it better answers the purpose of English and American readers.

Massage is founded upon anatomy, physiology, and pathology, and some knowledge of these subjects is necessary to intelligently prescribe or give the treatment. Without a knowledge of anatomy, it is impossible to follow nerve-trunks, separate and rub individual muscles, or carry out the treatment, in many cases, even when the most minute directions are given.

Physiology and pathology are best studied in relation to the cell. "Health and disease," says Green,† "must be considered as terms referring, not to the body as a whole, but to the cells of which it consists." Motion is the most obvious of the functions performed by the cell. There must be constant endosmose and exosmose through the cell-wall. These motions in the cell contents are regularly and normally carried on in a state of health and vigor, are irregularly or feebly carried on in disease, and their cessation constitutes death. When these motions are disturbed, what can be more natural and scientific than to introduce motion from without to restore and regulate it, and what agent will do this more perfectly than massage?

"The physiological effects of massage," says Reihmayer,‡ "are complex, mechanical, thermal, and electric. In addition to these, it also evokes manifestations in the domain of the nervous system, whose existence we can only explain on the theory of reflex action." The mechanical effects of massage, caused by the alternate pressure and relief from pressure, are most important, as they stimulate the interchange of cell contents, increase the circulation of the blood, and urge forward the flow of lymph.

Friction or stroking, when lightly applied, acts as a mild irritant to the skin, stimulating the reflex nervous system, and induces the contraction of the blood-vessels, and thus aids the circulation. Severe irritation dilates the blood-vessels, and so retards the circulation, except when made centripetally, when it also aids circulation, both in the blood-vessels and lymphatics. Kneading of the muscles is a sort of passive gymnastics, and is followed by similar favorable results. The mechanical element is stronger in kneading than in stroking or friction, and its physiological element is similar to the two combined.

Percussion is different, in that the impression is largely made upon the nervous system, which Reihmayer ascribes to "a molecular change in the nerve-tissue itself." An experiment of Dr. F. Goltz§ makes this plain. When he exposed the heart of a frog, and then percussed the abdomen, he observed that the heart pulsations gradually became reduced in frequency until the heart ceased to beat. This inhibition may be due largely to the reflex action of the vagi, and is sufficient to stop the heart-beat altogether. Such has been the result, when only a joke was intended, by slapping a sleeping friend over the abdomen, when instant death was the result. The experiments of Dr. Goltz, just referred to, produced a dilatation of the vessel of the peritoneum, which apparently almost utilized all the blood in circulation.

To quote again from Reihmayer:‖ "As we can, by means of brief and light percussion, develop first a contraction, and then, by a continuance of percussion of increasing severity, a dilatation, and, finally, a paralysis of the vascular system, so percussion will produce a similar train of effects upon the sensory nervous system. For instance, we observe that, if we percuss over a sensitive nerve, an increase of pain at first occurs, which, however, rapidly diminishes, then disappears entirely, and gives place to complete loss of sensation. The more sensitive the nerve, the less force and time are required to reduce it to this condition."

* "A Treatise on Massage," by Douglas Graham, second edition, p. 1.

† T. Henry Green's "Pathology and Morbid Anatomy," fifth American edition, p. 18.

‡ Tract No. 2 on "Massage," translated by Dr. Benjamin Lee, p. 9.

§ *Virchow's Archives* for 1863, vol. xxviii.

‖ Tract No. 2 on "Massage," p. 23.

Delicate electric currents are developed by the contraction of the muscles themselves and by friction. It has not yet been determined what proportion of these currents are due to the rise of temperature, to the metamorphosis of the tissues, or to the contractions, or hand of the operator. Yet electro-therapeutics clearly proves that many overwrought nervous temperaments are greatly benefited by currents which are so weak that they would be ineffectual in the vigorous and strong. The heat produced by dry friction is a very important physiological product of massage, and can often be most beneficially utilized.

The effects of massage in causing absorption has been proved by the experiments of Reihmayer* and Von Mosengeil.† Reihmayer injected water, proportioned to the weight of the animal, into the abdominal cavity of rabbits. He then subjected half the number of rabbits thus treated to abdominal massage. The rabbits were killed at the expiration of one and two hours, and the water remaining in the abdomen carefully measured. The percentage of the water absorbed during the first hour was much greater in the animals massaged. During the second hour, the absorption was a small percentage less in animals massaged, but still greater for the two hours than in those not so treated.

Von Mosengeil injected a solution of finely-ground black Indian-ink into the joints of rabbits. He then massaged certain joints, leaving the others untouched. The joints all swelled; but the swelling soon disappeared in the joints massaged, while the swelling remained stationary for some time in those not treated. The animals were then killed, and the joints and limbs examined. No trace of the ink was found in the joints which had been massaged, while it was found in considerable quantities, mixed with the synovial fluid, in the joints not treated. There was no trace of the ink found in the tissues above the joints which had not been manipulated; but it was found in numerous deposits in the areolar and interstitial tissues, and in the lymphatics of the limbs massaged.

From these considerations, it is evident that, in order to make massage "a scientific mode of treatment," it is necessary to have educated performers. Yet massage will surely never attain its proper place in therapeutics until physicians generally better understand the subject. Dr. Graham thinks that physicians should understand massage sufficiently to be able to give the treatment. However, the perseverance usually necessary in many cases, and the frequent inroads upon the time of the physician, renders it very necessary to depend largely upon nurses.

Even trained nurses are often deficient in manipulative skill; although every family usually has one person, at least, who thinks he is perfectly competent to give the treatment. It has been my experience that, when the treatment is given by an untrained person, especially a member of the family, the patient would progress just as well, or a little better, if the treatment be omitted entirely. In such hands massage can never be scientific; but will necessarily degenerate into mere "rubbing," without benefit to patient and with disgrace to the treatment. If the physician does not understand massage sufficiently well to give the minutest directions, the patient practically passes out of his hands. Massage should be directed definitely to the seat of the trouble, and not in an indefinite or vague way. If a nerve-trunk or a special part is effected, it is a useless waste of time and energy to give general massage, except when the system demands it.

The indications and contraindications for the use of massage are excellently expressed by Reihmayer:‡ "Massage is indicated in cases where the object is to arouse the normal physiological process of the organism to increased activity, to excite a more vigorous tissue transformation and interchange, and to reduce congestion and inflammation; further, it is the most efficient means of promoting absorption of all pathological products and deposits which can be thrown back into the general circulation without risk to the system.

"It is contraindicated, on the other hand, in all parasitic and infectious diseases, in morbid growths, and in a majority of cutaneous affections. Further, in all diseased conditions in which inflammatory products would have a pernicious effect upon the system, or in which the anatomico-pathological character of the morbid alteration would of itself constitute an insuperable obstacle to the attainment of a favorable result."

We hope that this line of our discussion has been sufficiently extended and clear to demonstrate that massage is a valuable therapeutic remedy and worthy of a first consider-

* Tract No. 2 on "Massage," pp. 27–37.

† Langenbeck, *Archiv für Klinische Chirurgie*, Bd. xix. p. 428.

‡ Tract No. 2, pp. 44, 45.

ation, and not merely to be used as a last resort. It may be the chief means in removing the *cause of the trouble*, which is usually the first consideration of the physician. It may be equally valuable in his second consideration, *to aid nature in restoring the patient to health.*

Massage is one of the most important principles of the S. Weir Mitchell* treatment of anæmic and neurasthenic patients. The isolation and complete removal of the patient from sympathizing friends is the first and most important step, as it is largely this sympathy that has reduced the patient to such a deplorable condition. The weakened anæmic system must then be built up, which may require rest in bed, with an abundance of such food as the patient can assimilate. Massage is especially useful in supplying the needed exercise. Electricity may have a similar effect to massage, but it can be dispensed with, while massage is essential to success in this treatment. Tonics, such as dialyzed iron, and especially sunlight and fresh air, are indispensable adjuncts. My appeals to sunlight and fresh air, in anæmic and nervous patients, have been very satisfactory.

The deoxidizing process of assimilation in chlorophyll-bearing portions of plants through the instrumentality of the sunlight, changing carbon dioxide and water into starch, water, and free oxygen, is well understood by the botanist. A similar beneficial effect is probably caused by the action of sunlight upon the human organism. While iron has not been detected as a chemical compound of chlorophyll, yet it is proved by actual experiment that iron, as well as sunlight and the activity of the cells, is essential to retain the chlorophyll in the chlorophyll-bearing bodies.† It is a question which future scientific experiments may practically demonstrate, whether the great tonic effects of iron, both in animal and plant life, is not largely due to the generation of electricity, which in turn aids in properly controlling the molecular activity of the cells. At least the beneficial effects of iron is not explained to my mind by its combination in hæmoglobin and through the production of red blood-corpuscles.

In all tonic treatment, the proper management of the diet must ever be one of the main considerations of the physician. It has several times been my greatest difficulty to prevail upon the patient to eat a sufficient quantity of such food as is necessary to supply the waste tissue. For instance, a school-girl, who would commonly be said to be "overworked in school," would eat no meat, except occasionally a small piece of pork. Her breakfast would often consist of a piece of toast and a cup of tea or coffee; for dinner, an apple and a piece of celery, a cracker, and a pickle; and at tea she would often drink a glass of milk, and doggedly persist in reading a story.

My patient's welfare has often led me to inquire into the kind of food, the quantity of each variety taken, the manner of preparing it, habits at table, etc.; and these inquiries have always given me valuable information, which I could use to greater advantage in better directing my patient's course. It is often difficult to convince patients that it is absolutely necessary to eat a sufficient quantity and variety of food to properly supply and nourish the system. To take a reasonable amount of exercise, and to take sufficient sleep, are two other rules which can never be recklessly or persistently disregarded without injury.

Massage, electricity, and passive or Swedish movements may take the place of exercise with many patients. In all patients or organs not sufficiently exercised, massage may serve a most valuable purpose. In constipation due to inefficient peristaltic action of the intestines, I know of no remedy so efficient as massage. Electricity may do much. Medication, especially combinations with nux vomica, attention to articles of diet, especially plenty of fruit, and a persistent effort in the morning to answer nature's calls, whether a feeling exists or not, have all given satisfactory results; yet I have succeeded in making permanent cures with massage where all of these have failed.

Accessible inflammatory deposits are usually most efficiently removed by massage. Massage is especially appropriate in many cases of adhesion and pelvic inflammatory deposits in women. In many instances complete relief is given by causing only the absorption of the part of the deposit which will relieve the pressure from the organs. Electricity, especially the negative pole of the galvanic battery, may have a similar good result. Iodide of potassium has given good results, especially in cases of deposits following pneumonia and not applicable for massage. At times, lifting the gravid uterus and allowing it to settle in such a way as to re-

* "Fat and Blood," by S. Weir Mitchell, fifth edition.
† "Bessey's Botany," pp. 50, 52.

move the pressure from some tender and painful spot may give instant and permanent relief.

It is claimed* that good results have followed the treatment of eye- and ear-diseases by massage. I cannot speak from experience; yet, in my judgment, many of these claims are an exaggerated statement of the enthusiast, and must eventually give way under the trying tests of experience, as the diseases are often not accessible to this treatment. It may be of greater benefit in eye-diseases. In atrophy of the optic or auditory nerves, electricity offers almost the only hope, and even this remedy is not flattering. I am confident that I have seen the use of too strong currents destroy the last ray of hope a little patient had of ever recovering his hearing. Massage has, at least, the advantage of not being fraught by such calamities.

In acute rheumatism, massage and electricity both failed to give satisfaction. The "alkali treatment" has given me the best results; far better than salicin. But massage gives probably the best results in subacute or chronic cases in removing inflammatory deposits. Iodide of potassium may do something, and electricity may do more, yet neither is so efficient as massage.

In weakened and inflamed conditions of the muscles, caused by injury, massage and electricity have a complementary effect.

N., aged 36, a Swede laborer, was sent to me January 13, 1892, and was treated as a clinical patient before the class in electrotherapeutics. He was suffering from almost complete muscular anchylosis of the shoulder-joint. About three months previously he was injured, while digging in a sewer, by about five hundred pounds of dirt falling upon his shoulder. The deltoid muscle was most injured, involving the brachial plexus, which was very tender. His health in every other way was perfect, so I gave him no medicine. I used massage and galvanization of affected muscles and nerves twice a week. Part of the time I used only electricity, and several times only massage. Electricity probably gave superior results, when used alone, although its superiority was not very marked. But when both remedies were used, even at the same sitting, the improvement was more rapid than it would appear their effects would be when used alone. Dowse† thinks that the elevation of temperature by massage prepares the patient for the better reception of electricity. In eight weeks, or seventeen sittings, my patient was dismissed with perfect use of all his muscles and able to work. It is a question which I hope to soon settle, for myself at least, whether there is not an antagonizing effect in electricity and massage, and whether better results would not follow their administration at different times, as electricity in the morning and massage in the evening.

In diseases of the central nervous system, massage has only been available, in my hands, as systemic tonic.

Mr. C., aged 60, was taken with a mild attack of typhoid fever in January, 1891. His greatest trouble, during his illness, was delirium and exhaustion, which I could only account for as a lack of nutrition to the brain, which was considerably relieved by digitalis. During convalescence he was greatly benefited by massage. As he recovered his strength, he was greatly troubled with aphasia. In consultation with Dr. Eskridge, it was decided that the cause of his trouble was due to a lack of nutrition of the brain. The patient was put upon syrup of the hypophosphites, a teaspoonful three times daily. Strychnine enough was added to make each dose contain $\frac{1}{60}$ of a grain, and this quantity was weekly increased until $\frac{1}{12}$ of a grain was given.

The patient improved very much under this treatment, but finally grew tired of the medicine, and ceased to be treated. About six weeks ago his wife called at my office, and informed me that he was gradually growing worse. Have now treated him twice weekly for three weeks with central galvanization only, and he is now in the best condition mentally he has been for over a year, and is gaining rapidly.

Johnny C., aged 10 years, was placed under my care in January, 1892. Was paralyzed when an infant; had completely recovered from the paralysis, but could not say a word which his folks could understand. My only treatment so far has been central galvanization twice a week, except when the weather has been such that he could not come to my office. He can now say "yes," "no," "mamma," "Fido," "won't do it," and many others, and is looking much more intelligent. Have not tried massage, as I would not expect any compensating results from that treatment.

Mrs. H., aged 22 years, was paralyzed September 5, 1890. Dr. Eskridge saw the case with me, and pronounced the case poliomye-

* "A Treatise on Massage," by Douglas Graham.

† "Lectures on Massage and Electricity," by Thomas Stretch Dowse, M.D., London.

litis. She was treated with massage from the first, and, as soon as the exciting symptoms were over, hypophosphites, strychnine, and electricity were given. Faradization soon ceased to give contractions, when galvanization only was used. Both upper and lower extremities were paralyzed. She soon began to regain the use of her hands and arms.

She made a visit to Michigan in January, 1891, and returned to Denver in September last, when her limbs were quite flexed. My efforts to straighten her limbs have met with only partial success so far. I am using an instrument similar to a crutch, the foot resting upon the cross-piece in the centre, while one end is fastened under the knee by an elastic strap passing over the knee. The other end of the instrument rests upon the floor, about three feet in front of patient's feet, making a lever of the second class.

She almost rebels at times, and instruments are laid aside. The massage has been given almost exclusively by her mother, who is quite apt and intelligent, yet lacks a knowledge of both anatomy and massage, except what she has read and I could find time to explain to her. There is no doubt in my mind that had she been under the care of a trained masseuse from the first, her present condition would be much better, although she is still gaining, and I hope to see her walk. She can do her own house-work by moving about in a rocking-chair, and can run a sewing-machine. She is now greatly delighted with dress-making, which occupies her mind, and is surely having a good effect by relieving her nervous condition. I am now trying to teach her to walk with crutches, which she can do by having some one to keep her from falling. I have been using galvanization to the lower extremities and lower part of the spine. This treatment is doing her good, yet its chief benefit has been to relieve a dysmenorrhœa, which has troubled her for years.

I have seen good results from both electricity and massage in nervous headache and neuralgia. In neuralgia of the fifth nerve, electricity has given me better satisfaction than any other remedy. Massage has failed to give me any satisfactory results so far in dyspepsia; and electricity has given relief in cases where massage failed. On the other hand, I have succeeded in restoring the appetite and strength in an emaciated case of phthisis by the application of massage, where every other recourse had failed me.

In conclusion, I do not believe that massage is a perfect cure for even the greater part of the ills which afflict human nature. Yet experience has clearly demonstrated to my mind that massage possesses remedial effects which cannot be perfectly secured through any other remedy or combination of remedies. These effects are not necessarily interfered with by the use of electricity, medication, or other remedial agents; but, on the contrary, such agents often very materially aid the successful results. In view of these facts, it seems to me but rational to say that massage should be studied and *used* just as we use any other remedy,—where it will best meet the indications.

To be able to so apply any remedy necessitates having a knowledge of the principles which underlie its application, as without this knowledge the remedy must be directed empirically and not scientifically. The principles of either massage or electricity are as easily comprehended as those of materia medica, and might be as safely intrusted to the general practitioner. Before the general profession can safely and properly apply either electricity or massage, they must be taught as required branches in all of our medical colleges, or patients must necessarily reap the calamities of ignorance in their application. It seems to me that the solution of this part of our problem must be our affirmative answer to one of three questions: Shall these subjects, one or both, be added to the list in our already overcrowded curriculum? Shall they be intrusted entirely to the hands of specialists, who have made themselves especially efficient? or shall they be surrendered to nurses?

INJECTING FLUID FOR FLEXIBLE ANATOMICAL PREPARATIONS.

By Addinell Hewson, M.D.*

In 1888, while making some experiments with Wickersheimer's fluid, the author happened to hit upon the following formula, which has stood the test of years in the claims which are here made for it.

The method followed is first to inject a fluid which will maintain the natural color of the tissues of the body, or rather exaggerate the redness, and then tone this down by such of the chlorides having well-known bleaching properties. The fluid can be introduced by either atmospheric pressure or the piston syringe through the aôrta.

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First Injection.—The first injection contains the following:

Ac. carbol. (No. 1), delq., ℥iv (118.40 c.c.);
Aquæ dest., Ovi (3785 c.c.);
Potass. nitrat., lb. ii (746.46 gm.);
Glycerin pur., Oii (946.22 c.c.).

Not earlier than twelve hours after this has been injected the second injection may be introduced, although twenty-four hours may elapse.

Second Injection.—

Glycerin pur., Oviii (3785 c.c.);
Aquæ dest. bul., Oii (946.46 c.c.);
Spts. ven. rect., Oiv (1892.92 c.c.);
Hydrarg. bichlor., ℥ii (62.20 gm.);
Ac. arsenios, ℥i et ʒvi (54.40 gm.).

The second injection is made by boiling a portion of the glycerin, all the water, and arsenic together until the arsenic is dissolved. The corrosive chloride, being dissolved in alcohol and glycerin, remaining, the two portions are then mixed in glass or porcelain, and allowed to enter the body by atmospheric pressure.

Result of First Injection.—After the first injection has been made, the redness imparted to the body is lifelike. The amount of fluid is sufficient to distend the body thoroughly and wash out any remaining portions of the blood in the arteries, the operator having taken care to remove any clot from the aorta, carotids, and subclavians that may be present, as these materially interfere, when a tallow injection is to be made afterwards. In twenty-four hours the hyperdistention subsides: the superficial veins show the presence of a bloody fluid, owing to this distention.

The operator may preserve the lungs by taking the precaution to separate and ligate the pulmonary artery close to the heart with a running knot.

Now, after the first injection is made, and at the time of the second injection, if the body seems too much distended, the operator can make an incision into the pulmonary artery, sliding his running knot over it, and fastening again, thus protecting the lungs and leaving an outlet for overdistention through the venous system.

Second Injection.—The second injection being now allowed to enter through the aorta, the body is again distended to its fullest capacity, the operator having entirely under his control the amount of fluid he will allow to escape from the body.

Time Occupied.—The time occupied in both of these operations, of course, will depend upon the condition of the vessels and the density of the fluids. As the first fluid is of a lighter density, it usually takes about ten minutes for it to enter the body by the atmospheric pressure method. The second being heavier, takes nearly half an hour, and sometimes more.

Subjects Selected.—As the fluid is more expensive than the chloride of zinc solution used usually for dissecting-room purposes, the subjects upon which these experiments were tried were all selected as to the condition of the arteries, and were never over fifty years of age, the cause of death being known in each instance,—*i.e.*, they were for class demonstrations, and had to be the best obtainable.

Results on Skin and Fasciæ.—As no means were taken to harden the epidermis, this layer of the skin will come off in places, on account of the character and quantity of the fluid employed, but the cutis vera will remain soft and pliable, which is not the case after other arsenic injections. The superficial and deep fasciæ retain their normal appearance, barring the distention from the excess of fluid in the former.

Muscles.—The color of the muscles is slightly darker than normal, but one peculiarity about this is that, when first dissected, it is slightly lighter than afterwards, seeming to follow the change taking place in the uninjected body without undergoing any decomposition whatever.

If, however, the muscle is kept exposed for some time to the light in either the two fluids mixed or in alcohol, there will appear a color similar to blue ointment in the bottom of the vessel and in the interstices of the specimen, doubtless due to a change in the mercurial salt to a monochloride. Should the specimen, however, be excluded from the light, this change in color of the muscle is not so rapid, although the sediment is present. If now a specimen, after dissection, is allowed to remain exposed to the atmosphere, it changes in color to a brownish black, but will never lose its flexibility.

On Viscera.—The viscera remain pliable, and decrease in size; especially is this the case with the liver, due to the fluid draining off, and the parts not being constricted or tanned in any way, the decrease, therefore, being due to its flexibility. The color is slightly darker in all the viscera where blood is retained, but no decomposition has ever taken place.

The effect upon the arteries is one which

the dissector delights in, especially if a tallow is used, because their elasticity is preserved. If the body is warmed through before the tallow is injected, the fine blood-vessels of the skin can be seen, and then, if the artery is pinched by the forceps, it returns to its normal condition easily.

Specimens so injected may be preserved either in the mixed fluids, or in alcohol and glycerin, or in alcohol alone, or in the atmosphere, and its elasticity is retained.

The author's experience with Wickersheimer's fluid was not favorable, as it was not a good preservative, and did not compare at all favorably with the above.

350 South Sixteenth Street.

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*THE VALUE OF SOME OF THE NEW MEDICAMENTS.**

By H. A. Hare, M.D.†

I AM very well aware that those who hear me read this paper are fully as well qualified to determine the value of many of the new remedies which have been brought forward within the last few months or years as I am, yet I have felt that the statement of my own experience, in hospital and private practice, might be of interest.

The first to which I shall ask your attention is *camphoric acid.* As will be seen, camphoric acid is a white, micaceous, powdery substance, devoid of odor, and almost of taste. It is, unfortunately, practically insoluble in water, and must be given in pills, capsules, or compressed tablets. Originally introduced into medicine as an insufflating powder in cases of coryza and hay-fever, I have found it, as have Mairet and Combemale, of Paris, of the greatest possible value in night-sweats, be their cause what it may. It is in the night-sweats of phthisis that I have found it most useful. Any one who has had many of these cases to treat will have had repeated failures from the older antihydrotics. In my earlier terms of service at St. Agnes's Hospital I employed sulphuric acid, belladonna, atropine, minute doses of pilocarpine, and a number of similar remedies, with one of several results. Either relief was obtained temporarily, the patient having a comfortable night or two before the medicine failed him, or, more frequently, the dominant action of the drugs upon other portions of the body than the sweat-glands was so strongly manifested that the dryness of the throat, the belladonna wakefulness, or the pilocarpine nausea prevented the administration of large enough doses to be effective. The separate or joint use of spongings with alum-water either did good but for a few hours or else failed entirely, as did also the external use of other astringent external applications.

Camphoric acid, under these circumstances, proved to be a most efficient drug, for it has stopped the sweats in every case; in but one out of some sixty cases in which I have used it has it failed, and it has become as constant a mode of treatment as is the cough-mixture to allay excessive cough. I would as readily undertake the treatment of a case requiring an anæsthetic without ether or chloroform as one of phthisis without camphoric acid. I will not weary you with reports of cases; suffice it to state that the drug should be given in one full dose two hours previous to the expected sweat, being placed dry on the tongue, and washed down with water or wine, or it may be given in capsule. If any diarrhœa is present, compressed tablets cannot be used, as they will be swept out of the alimentary canal before their contents can be absorbed. The average dose is 20 grains, but I have frequently given 60 grains at a time without bad effect, and on one occasion as much as one hundred and eighty grains a day without injury to a frail woman. Further than this, I have never seen it cause a symptom which would show that it had been given, save the arrest of the sweating.

The next drug I have been less fortunate with,—namely, *piperazine.* In six cases to which I have given it for gout or rheumatoid arthritis or uricæmia, I have failed to observe any improvement. One of these patients was a retired naval surgeon, suffering from a well-marked attack of gout in the big toe of the right foot, who was well qualified to pursue a proper diet under medical direction, and to watch changes in the urinary secretion. After three weeks, he was still taking piperazine, without any change for the better, except that which would be natural in the course of the disease. Another case of gouty eczema was equally unfortunate, and cases of chronic rheumatism of the joints, with deposits of urates, received the drug internally, and also by injection into the swollen joints,

* A paper read before the Pennsylvania State Medical Society, May 18, 1892.

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without any relief. The doses given were those recommended by the manufacturers,—namely, 15 grains in divided doses, taken during twenty-four hours in a pint of water. The drug is of service, according to some clinicians, but my experience with it has been unfortunate.

Codeine, well known to you all as one of the alkaloids of opium, is hardly to be considered as a new remedy, yet I am sure that it is not used in diabetes mellitus as much as it deserves. Often it fails because the dose used is too small. From 1 to 2 grains three times a day is not too much in some cases. The following history is of interest, and emphasizes the advantages of codeine.

F. A. M., aged 41, white, married, native of United States, admitted to St. Agnes's Hospital February 18, 1892; father living and well; mother dead, cause unknown; no previous illness, except suppurative tonsillitis; has been complaining ten years; was taken with great thirst, perversion of appetite, polyuria, and frequent micturition, loss of flesh, and general wretchedness. He received no treatment for four or five months, but then went to a physician, who prescribed ergot and laudanum, with no benefit.

Examination of urine showed it to have a specific gravity of 1042; sugar, ten per cent. Fifty-two ounces of urine were passed in twenty-four hours.

He was put on an anti-diabetic diet, and given codeine, gr. ½ t. i. d., increasing half a grain until gr. ii t. i. d. was given, when excessive drowsiness caused reduction to gr. i three times a day, at which he continued.

February 22.—Examination of the urine showed a specific gravity of 1038; sugar, five per cent.; forty-eight ounces of urine in twenty-four hours.

February 27.—Examination of urine showed specific gravity 1033; sugar, four per cent.; thirty-four ounces of urine in twenty-four hours.

March 3.—Examination of urine showed specific gravity 1027; sugar, three per cent.; urine, thirty-two ounces in twenty-four hours, a decrease in specific gravity from 1042 to 1027, and of sugar from ten to three per cent. in two weeks.

March 4.—Discharged.

Croton chloral, or butyl chloral hydrate, is a preparation far safer than ordinary chloral, and is peculiar in its influence over the branches of the fifth pair of cranial nerves. The new analgesics—antipyrin and acetanilide, as well as phenacetin—have overshadowed croton chloral, but it nevertheless will often succeed where they fail. In neuralgia of the face and forehead, croton chloral, in from 5- to 20-grain doses, in pill form, may be given with good results. The following case is of interest, as showing its power:

Mr. T., aged 67, came under my charge suffering from an exceedingly severe neuralgia, which involved the branches of the fifth nerve. The pain was so severe that he sat crouched upon a sofa, holding a handkerchief to the right eye, from which the tears ran in profusion, and they had flowed until the parts had become macerated and sore from constant moisture. Any attempts at speaking increased the pain to such an extent that conversation was impossible, and the pain was so severe that he was almost aphasic, and exhausted from inanition, for eating was impossible. In addition to the pain, which involved the nerves at the right side of the mouth, there was also intense pain in the supraorbital nerve, and the whole right side of the face was hyperæsthetic.

His physician had done everything that he could think of for his relief, and had given him nearly all the newer and older remedies for neuralgia, even going so far as to inject into the face between the eye and the mouth several drops of chloroform without relief. The only result of this injection was closure of the lachrymal canal, so that his condition was rendered much worse.

He was at once placed upon 10 grains of croton chloral, given three times in the twenty-four hours. After the third dose he was almost entirely relieved, and during a stay in the city of two weeks remained practically free from pain, being able to talk, drink, and eat without any return of his malady. He then returned to his home in the country, and two weeks afterwards reported that he was still free from pain, although the doses of croton chloral were being cut down to less than half of what he was taking while under my charge.

Salts of Strontium.—There are now on the American market an iodide, a bromide, a phosphate, and a lactate of strontium. Of these the only two I have tried sufficiently to speak of them are the bromide and lactate.

The bromide seems to be possessed of less power as a bromide than the corresponding salts of potassium and sodium, but it does not cause in my experience the eruptions of

the skin which the latter produce. The taste is not so disagreeable when it is given in solution, and it is less apt to disorder the stomach. Indeed, as is well known, it seems to be very useful in painful dyspepsias and in gastralgia, allaying soreness and tenderness. The dose I have given has been 10 to 30 grains three times a day. The lactate of strontium, recommended originally by several French clinicians as a remedy for the albuminuria of Bright's disease, has seemed to be of very considerable value, and Dr. J. C. Da Costa, of Philadelphia, has informed me that in his hands the drug has proved peculiarly efficacious. Unfortunately, the albuminuria is apt to return if the drug is withdrawn. The dose of this salt is 30 grains three times a day.

Creosote has been so largely used within the last two years in the treatment of pulmonary phthisis that the journals both in this country and abroad have been full of reports concerning its use. I shall not quote the results separately, merely stating that most, if not all, the reports have been favorable. I am sure that, if every physician had reported all his cases carefully, whether his results were good or not, that the evidence would not be as strongly in favor of the drug as it appears. I have given creosote in all stages and forms of phthisis, and have never seen it do good, except in one class,—namely, that in which the process was hardly "on its feet," if I may use such an expression. In other words, when there was a catarrhal pneumonia just passing on into a true tuberculosis, or where the expectoration seemed largely bronchial and in excess of the amount which the physical signs would lead us to expect,—that is to say, not the excessive expectoration of the full-developed tuberculosis, but the mucous expectoration more like that of the later stages of a severe but benign bronchitis. These transition cases are benefited, the others are not. I have always given the creosote in ascending doses, beginning with 2 drops three times a day, and increasing a drop a dose until the stomach or bowels show that the limit has been reached. Several of my patients have taken up to from ninety to one hundred and twenty minims of creosote a day, and in the cases which it suits these large doses seem necessary.

The statement made by a number of German observers that creosote is contraindicated in these cases of phthisis which have much febrile involvement or hæmoptysis has been confirmed by my experience. The most agreeable way to administer the large doses of creosote of which I have spoken is to give it in capsule, or to drop the creosote upon the surface of half a glass of milk, which, if swallowed in large gulps, prevents the creosote from being strongly tasted.

The disadvantage of the capsule is that it sets free a large amount of the pure drug upon the mucous membrane of the stomach, and is, therefore, apt to cause gastric irritation sooner than in those cases which take the creosote with the milk.

In chronic bronchitis I have found the creosote of singular advantage, and have been able to relieve a number of cases by its employment. The following instance is an example of this:

J. C., aged 25; residence Delaware; came to my office complaining of a chronic bronchitis, from which he had suffered for seven or eight years. During this time he had never been entirely free from cough, but no loss of flesh had occurred, although expectoration was quite constant. He was a little better in summer than in winter. Physical examination and his general appearance showed that there was no tubercular condition of the lung present. He had taken, he told me, a large number of the older and of the newer expectorants. Indeed, in his opinion and in the opinion of his physician, he had about exhausted the list of remedial measures suited to his condition. He had not, however, tried creosote except in small doses of 1 or 2 minims a day, which had produced no effect upon the condition of the bronchial tubes. Under my direction, he took ascending doses of creosote, and was told to watch his urine, and, if it became cloudy, to report at once. He reported to me continually for the space of about five weeks, during which time he was able to reach 17 minims three times a day. Larger doses than this produced a smoky urine. A patient trial of this remedy, given in this manner, decreasing the dose to a drop as soon as the smoky urine appeared, and then gradually increasing it again, resulted in a complete cure after about two months' medication.

He continued under observation, off and on, for about three months longer, during which time he expressed himself as having been entirely relieved, and I have not heard from him since.

In conclusion, the writer may be allowed to call attention to camphoric acid and croton chloral as particularly useful drugs in certain cases.

THE PRACTICAL APPLICATION AND THERAPEUTIC USE OF PLASTER OF PARIS.

By J. P. Mann, M.D.*

(Concluded from page 248.)

AFTER surgical or mechanical operations for the cure of club-foot, the new and corrected position of the foot is best maintained by the proper use of the plaster-of-Paris dressing. After surgical operations, apply the plaster case over the absorbent cotton bandages, because swelling of the foot may cut off its blood-supply. The tips of the toes should be left uncovered, so that the surgeon may detect any tendency to constriction, which will be manifested by weak circulation of the blood. Gangrene of the entire foot or sloughing is sure to follow when the blood is shut out too long. The foot is to be examined immediately after the plaster case hardens, again in twelve hours, and then daily. If the circulation is stopped, by reason of the swelling of the foot, cut through the anterior surface of the plaster case, and open it far enough to relieve the pressure. An ordinary bandage passed around the case, after the swelling subsides, will hold its cut edges together. If there is too much pressure against some bony prominence, and the blood-supply of the foot is sufficient, a trap-door cut in the case at the point of pressure will give relief. When the foot is redressed, a new plaster case is applied. Sometimes many operations and plaster cases are necessary to correct badly-deformed feet. If no more operations are required, the patient should wear a good shoe, in which, in obstinate cases, an iron sole is placed to which is fastened a steel brace, jointed at the ankle, and extending to just below the knee.

In mechanical operations, the patient is etherized and by means of levers acting on an iron sole, which is securely bandaged to the foot, an attempt is made to straighten the foot by stretching and tearing the contracted tissues. Thus, after one or more trials, the foot is forced into a correct position, and immediately after every trial a plaster case is put on. When mechanical operations and subcutaneous or open sections are done, it is better to use absorbent lint bandages beneath the plaster case, whenever the foot is not swollen, for a closer fit is obtained, and the foot is held more firmly in its new position. This treatment does not apply to those light cases of club-foot where manipulation, proper shoes, and steel braces will effect a cure.

If dislocations of the shoulder, hip, or any other joints of the extremities are reduced, a closely-fitting, lint-lined plaster case will maintain the bones in correct position. If swelling occurs, cut through the case, and thus relieve the pressure. These cases can be put on immediately after the reduction of a dislocation, without the least danger to the patient. If the surgeon desires to see the joint without removing the plaster-case, a trap-door is cut in the case just over the joint. Lead-water and laudanum, or any application, can be made through this opening.

Two years ago a blacksmith came to the orthopædic department of the Jefferson Medical College Hospital. In descending his door-steps he fell and wrenched his back, and was thereby confined to his bed four weeks. When he got about again, he experienced constant and distressing pain in his back, and was unable to work. A plaster-of-Paris jacket was put on, and in one week's time his pain was gone. In three months he was cured, and ceased to wear the jackets. Applications can be made, just as in dislocations, through a trap-door; but when this is done, several layers of absorbent lint are bandaged over the injured part to hold the solution. In this manner sprains of any joint may be treated. Complete rest is secured, injurious pressure from too much swelling is easily avoided by opening the case, and this latter quality allows it to be put on immediately after the reception of the injury.

No splint will take the place of a plaster case in the after-treatment of excisions of joints. The dressing of a knee-joint excision will illustrate a proper method of application, but in excisions of other joints the dressing is modified to meet the requirements of the case. When the operator is done and the aseptic dressings are in place, commence at the toes and envelop the entire leg with absorbent cotton bandages. A plaster case is applied from the toes to just below the seat of the operation, and a second one commences above the wound, and is carried up the leg as far as possible. Two pieces of iron, curved in the middle, each piece being about twenty-four inches long, one inch wide, and one-eighth of an inch thick, are covered with a single layer of plaster bandage, and placed along the sides of the plaster cases, with their curves opposite to and looking away from the wound. The ends of the irons which lie along the lateral surfaces of the upper case are now

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secured by several turns of a plaster bandage. Then the operator holds the leg in proper position, and, as above, fastens the lower ends of the irons to the lower case. The irons are curved outward to give more room for dressings. If necessary, in dressing children, the case is made to extend over the hip-joint and around the lower part of the trunk, thus preventing motion of these portions of the body. This case is removed in from eight to twelve weeks. In operations on contracted soft tissues, the plaster case will retain the parts in their corrected position.

The number and variety of splints employed in the treatment of fractured bones evidence imperfection in many of the plans. All of the bandages and splints for a fractured clavicle are very likely to slip; but, if a suitable pad of cotton is put in the axilla to carry the shoulder outward, when the arm is placed against the patient's side, and forced sufficiently upward and backward, and a plaster case, embracing both the arm and the chest, is applied, it will not slip, nor need frequent reapplication. A plaster jacket does excellent service in cases of rib fracture. Fractures of the bones of the legs, when situated below the upper third of the femur, are easily managed by means of the plaster case. When treating compound or ununited fractures, the irons are used in the same manner as they are employed in joint excisions.

In simple fractures the case can generally be put on in one piece and a trap-door made.

I have seen children, with infantile paralysis, who could not stand up or sit erect, begin to walk immediately after having a plaster jacket applied. Electric and other treatment is kept up in these cases, and the jackets are removed for free muscular exercise and during the night.

A plaster dressing hardens in about five minutes; it is easily removed and replaced without breaking; a trap-door exposes the injured portion to view; a cut through the length of the case precludes all danger from swelling or pressure, and with care it can be applied in a parlor. Therefore the objections in regard to loss of time, want of ablutions or free exercise, inability to see the injured part, danger from swelling or pressure, and lack of cleanliness do not hold good. By putting the case on in three parts (see excision of joints) permanent extension is secured. In simple fractures of the long bones, the irons are not used, for the middle portion of the dressing is composed of plaster bandages, and is made to overlap the upper and lower cases. A plaster dressing is cheaper than any other splint, and we meet with Lazarus more frequently than with Dives.

AN EXPERIMENTAL STUDY OF CERTAIN ACTIONS OF STRYCHNINE IN EXCITANT AND PARALYTIC DOSES.

By Edward T. Reichert, M.D.,* Philadelphia, Pa.

(Concluded from page 301.)

Part II.

THE ACTIONS OF PARALYTIC DOSES.

THE investigations embraced in Part I. have shown as important points,—1, that the motor disturbances and convulsions are of spinal origin; 2, that the sensory nerves and muscles are unaffected; 3, that the motor nerves, after the onset and continuance of convulsions, become depressed, solely from overwork; 4, that the pulse is at first lessened in frequency, then increased, and again diminished, the first effect being due to a stimulation of the cardio-inhibitory apparatus, the second to its depression, and the last to a depression of the excito-motor and automatic motor ganglia of the heart, especially the former; 5, that the arterial pressure is primarily diminished, then greatly increased, and at last diminished, the first effect being due to some obscure action on the vaso-motor centres in the medulla oblongata, the rise to a stimulation of the vaso-constrictor centres in the medulla oblongata, and the final fall partly due to their depression, but chiefly to cardiac depression; 6, that the respiration-rate is not specifically affected, unless it be in a decrease or during the period of convulsions, when it may be decidedly increased, the first effect being the result of a depression of the respiratory centres, and the second to the sharing by these centres of the excitement of the general nervous discharge, especially from the spinal motor centres, or through the indirect influence of muscular activity; 7, that the bodily temperature is increased, this being due to an increase of heat production, which is to some extent independent of the motor excitement.

By modifying the size and number of the doses, the stage of excitement may be prolonged over an almost indefinite period, and all of the successive phases of the actions of the poison slowly developed; or, on the

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other hand, as shown by Spitzka (*Journal of Nervous and Mental Disease*, vi., 1879, p. 269) and Wood ("Therapeutics: Its Principles and Practice"), enormous doses thrown directly into the circulation may overwhelm the nerve-centres, and cause almost instant death.

These experiments I have repeated and extended, and have found that death is due primarily to a paralysis of the respiratory and motor centres, so that the animal dies from asphyxia. If, therefore, artificial respiration be practised, life may be preserved, and we are thus enabled to study the final actions of this remarkable substance, or, in other words, the phenomena of the stage of paralysis.

The method which I have adopted in making these novel studies is to fasten the dog in the conventional trough, etherize, insert a tracheal tube, and connect one of the carotids with the kymographion. After recovery from the ether, a one per cent. solution of the sulphate of strychnine is injected into the external jugular vein at the rate of from one-fifth to one cubic centimetre each second, depending upon the weight of the animal and the effect on the circulation. Within twenty seconds, usually from the beginning of the injection, the muscles of the extremities and trunk become stiffened, followed immediately by tetanic convulsions of greater or less violence, according, largely, to the rapidity of the injection, the paroxysms being more marked after a slow injection. At the moment of the occurrence of rigidity, forced artificial respiration is begun and maintained, an abundance of air being given, far more than necessary for an animal under ordinary circumstances. The tetanus lasts for but a few seconds, and is replaced by strong jerkings, especially marked in the legs. These become less and less marked, and gradually pass into fibrillary twitchings, which, in turn, fade away, so that within from two to four minutes from the beginning of the injection all voluntary motion is lost, and the animal lies absolutely quiet, save for the movements produced by artificial respiration and the heart-beat. Movement is last observed in the fibres of the scrotum or in the vaginal sphincter, these occasionally persisting for some time, but especially noticeable is a rhythmical contraction of the latter muscle. When this condition of paralysis has supervened, the motor reflexes have entirely disappeared, the orbital reflex being lost before the knee-jerk, indeed, even before the loss of movement in the muscles of the trunk and extremities. The circulation and the heat processes remain in good condition; and, as far as general appearances go, one might think the animal curarized, although, as will be seen later, there are many striking differences.

This state of absolute muscular quiet is not, as a rule, of long duration, unless the dose has been unnecessarily large, for in the course of fifteen to twenty minutes fibrillary twitchings appear, invariably in inverse order of their disappearance from the various parts, they first being noticed in the scrotum or vaginal sphincter, then in the posterior extremities, then in the fore extremities, and then in the trunk. These movements become more and more marked, gradually passing into violent jerkings, which, in turn, assume the character of clonic convulsions. Should, however, a few cubic centimetres of the solution be injected from time to time, whenever twitchings reappear, the animal may be kept alive in this paralyzed condition for many hours, if not days.

The quantity of strychnine necessary to produce absolute muscular quiet varies with the susceptibility of the different animals, the average being from .015 to .02 gramme to the kilo.

In Experiments 31, 32, 33, and 34 the effects on the pulse and arterial pressure are essentially of the same character, the differences being in degree rather than kind. Immediately after the beginning of the injection, the pulse-rate is invariably greatly reduced, and so marked is this at times that the heart's action is completely arrested for ten to twelve seconds or more, and then begins with extreme slowness, rapidly gaining in the number; but the normal rate is never reached, and after from one to three hours again shows a tendency to decrease. The slow pulse is accompanied by strong systoles, which may be nearly thirty-five times stronger than the normal (Experiment 12), although seldom exceeding seventeen times, as in Experiment 31. The increase in the force of the heart-beat is always decided after these large doses, and is not simply dependent upon the greater filling of the heart with blood, owing to the slower contractions, because the height of the curves is not always in *direct* ratio to the slowness of the beat, although they are in a general way associated.

The pressure is in all cases, unless the dose has been excessive, enormously increased during the injection, the rise occurring co-

incidently with the onset of convulsions, but independent of them, as already shown, and in experiments which follow. After the primary increase, the changes are of a more or less uncertain character. Generally, as in Experiments 31 and 33, it is followed by rapid and decided, but transient, fall, the minimum being reached in about two minutes, this being succeeded by a rise, the maximum being reached within from ten to twenty minutes, which may exceed the primary rise (Experiment 33). This secondary increase is followed by a diminution to below the normal, which continues throughout the subsequent hours of observation. In other experiments the primary rise persists (Experiment 32), and gradually gives way to a decline, while in others (Experiment 34), in which the dose was excessive, only a very slight and very transient primary increase is noted, and this is followed by a decided decline, the pressure remaining below the normal throughout. The records of Experiments 31 and 33 may be considered typical.

In Experiment 35, on a curarized dog, it will be found that the results do not mate-

Experiment 31.—Dog; weight, 21.8 kilos.

Time. min. sec.	Dose. grammes.	Pulse per min.	Pressure. mm.	Rectal temperature.	Remarks.
.00	.4	240	176	38.84°	Pulse-waves 3 millimetres high.
.18		.....	272	.....	Tetanus.
1.30		55	112	.....	
3.00	.....	72	156	.....	Heart-beats very strong; pulse-waves from 52 millimetres to 25 millimetres.
4.30	.....	93	220	.....	
10.00	.....	114	234	39.12°	
15.00	.1	.....	...	.....	Slight twitchings.
.22					
20.00	.....	81	116	39.28°	
25.00	.1	94	152	39.34°	Slight twitchings.
.20					
35.00	.....	87	112	39.38°	Absolutely quiet.
50.00	.1	93	114	39.33°	Slight twitchings.
.18					
65.00	.....	96	104	39.31°	
80.00	.....	97	116	39.33°	Slight twitchings; pulse irregular.
95.00	.....	96	98	39.28°	
110.00	.....	114	104	39.28°	
125.00	.2	.....	...	39.13°	Slight twitchings.
.40					
140 00	.....	114	84	38 94°	
155 00	.....	120	86	38.97°	Absolutely quiet.
185.00	.....	96	100	38.90°	Occasional slight twitchings.
230.00	.2	91	106	38.94°	
.23					
260.00	.....	96	84	38.72°	Absolutely quiet.
290.00	.....	96	100	38.58°	
320.00	.2	90	120	38.38°	Slight twitchings.
.23					
350.00	.....	101	84	38.12°	
420.00	.....	110	158	37.69°	Strong jerkings; stopped artificial respiration; pressure fell progressively.

Experiment 32.—Dog; weight, 19.25 kilos.

Time. min. sec.	Dose. grammes.	Pulse per min.	Pressure. mm.	Rectal temperature.	Remarks.
.00	.3	236	142	39.22°	Tetanus.
.12					
.18					
1.30	...	144	258	.....	Slight jerkings; pulse-curves higher.
2.32	...	144	266	.....	
4.00	...	141	216	.....	Slight twitchings.
6.00	...	114	194	.....	Absolutely quiet.
10.00	...	102	180	39.48°	
20.00	...	108	194	39.51°	
35.00	.2	114	176	39.58°	Slight twitchings.
36.00					
50.00	...	108	116	39.62°	Absolutely quiet.
65.00	...	120	116	39.61°	Stopped artificial respiration; pressure began to fall in a few seconds, and continued downward.

Experiment 33.—Dog; weight, 11.8 kilos.

Time. min. sec.	Dose. grammes.	Pulse per min.	Pressure. mm.	Rectal temperature.	Remarks.
.00		.....	174	39.30°	Pulse-curves 5 millimetres high.
.22	.10	123	222	.....	Tetanus; heart's action very slow and strong; long diastoles; pulse-curves 28 millimetres high.
.37		18	30	.....	
1.30	.....	87	99	.....	
2.30	.....	63	56	.....	Slight twitchings.
5.00	.....	60	56	.....	
7.00	.....	78	112	39.80°	
9.00	.....	96	212	.....	
11.00	.....	108	240	.....	
16.00	.03	114	244	.....	Slight twitchings.
.35					
22.00	.09	96	190	39.82°	Slight twitchings.
.40					
37.00	.....	111	178	39.70°	
50.00	.06	89	118	39.53°	Slight twitchings.
.30					
80.00	.....	99	138	39.33°	Slight twitchings.

Experiment 34.—Dog; weight, 9.5 kilos.

Time. min. sec.	Dose. grammes.	Pulse per min.	Pressure. mm.	Rectal temperature.	Remarks.
.00		210	128	39.82°*	Pulse-curves 3 millimetres high.
.23	.30	.....	136	.....	Tetanus; heart's action very slow; long diastoles; very high curves.
1.10		.....	.....	.....	
.30		90	56	.....	Pulse-curves 34 millimetres high.
3.00	.....	42	24	.....	Absolutely quiet.
8.00	.....	42	24	.....	
13.00	.....	40	28	.....	
18.00	.....	42	40	.....	
28.00	.....	54	44	.....	
40.00	.....	60	48	.....	
55.00	.....	78	54	.....	
70.00	.....	72	46	.....	
130.00	.....	55	38	36.13°	Stopped artificial respiration; pressure fell.

* The column of mercury in the thermometer was broken, so that the exact changes during the decline were not determined.

rially differ from those in the typical experiments just alluded to.

The causes of these circulatory disturbances have been sought in the succeeding investigations.

The Pulse.—In Part I. it was shown that the frequent pulse, which usually accompanies the tetanus, is due to a depression of the cardio-inhibitory apparatus, chiefly of the centres in the medulla oblongata. After such large doses as used in this series of experiments, this increase in the pulse-rate is always replaced by a pulse that is slow and full. This latter effect without question represents a more advanced action of the poison, and it, therefore, does not seem possible that the depressed state of the cardio-inhibitory apparatus could have given place to one of stimulation, and thus be the factor in the production of the slow pulse. This is rendered positive in the records which follow.

In Experiments 36 and 37 the vagi were cut before the injection of strychnine, thus functionally destroying the extrinsic cardio-inhibitory centres. In Experiment 38 the same nerves were severed during the progress of the decrease in the pulse-rate.

In Experiment 39 the vagi and cervical portion of the spinal cord were cut, thus severing the heart from its centres in the medulla oblongata.

In these experiments the same changes in the heart-beat are observed as in intact animals. This conclusively indicates that the cardio-inhibitory centres play no active part. As these alterations could not occur from any action on the accelerator centres of the heart in the medulla oblongata, and as they occur after the isolation of the heart from the nerve-centres, it is evident that the action must be directly on the heart. This is also indicated in the records of Experiment 38, in which the vagi were cut during the progress of the decrease in the pulse-rate. After the

pulse had declined from 180 to 66, the vagi were cut, with the immediate result of an increase to 168, and then a fall. Were there not some direct action on the heart, the pulse-rate should have gone far in excess of the normal. The question then arises, What part of the heart is affected, the ganglia or muscle?

That the inhibitory ganglion is not stimulated is shown by Experiments 38 and 39, and others, in which a powerful electric current failed absolutely to cause any inhibition.

Experiment 35.—Dog; weight, 41 kilos. *Curarized.*

Time. min. sec.	Dose. gramme.	Pulse per min.	Pressure. mm.	Remarks.
.00 .37	.3	153	66	Normal pressure 160.
.40	.....	138	82	
1.00	.....	126	122	
2.00	.....	114	90	
5.00	.....	112	37	
10.00	.....	108	66	
15.00	.....	108	78	
20.00 21.02	.15	108 96	78 56	Pulse-curves high.
26.00	.....	93	72	
31.00	.....	104	106	
35.00 .44	.12	104 90	116 90	Pulse-curves high.
40.00	.....	90	82	
45.00	.....	91	102	
55.00 56.00	.30	104 90	118 70	
61.00	.....	105	70	
70.00	.....	108	96	
75.00 .36	.30	106 108	100 68	
80.00 81.13	.60	100 100	80 80	
86.00 .10	.60	100 96	80 56	
90.00 92.40	1.05	105 101	64 46	
110.00 .20	.75	92	50	
120.00	.....	78	74	Total quantity of strychnine injected 3.87 grammes.

Experiment 36.—Dog; weight, 36.28 kilos. *Vagi cut.*

Time. min. sec.	Dose. grammes.	Pulse per min.	Pressure. mm.	Rectal temperature.	Remarks.
.00 .22 1.10	.7	204	138 240	39.42°	 Tetanus; slow, full pulse. Slight jerkings in extremities.
1.30	.....	84	40	.....	
10.00	.....	90	62	39.93°	Pulse-curves much higher.
15.00	.....	99	98	39.98°	Absolutely quiet.
20.00	.....	108	106	39.97°	Slight twitchings in hind extremities.
23.00 .40	.2	.....	.....	.....	
25.00	.....	108	66	39.88°	
26.00 27.00	.2	.....	.....	.....	
40.00	.....	110	78	39.96°	Absolutely quiet.
55.00	.....	102	80	39.95°	Heart's action irregular.
110.00 .32	.2	98	80	40.02°	
140.00	.....	.....	76	40.60°	
155.00	.....	95	78	40.22°	Slight twitchings.
170.00	.....	90	48	40.31°	
185.00 .10	.1	.....	.....	40.31°	Slight twitchings.
240.00 .20	.2	.....	78	40.18°	Heart's action irregular.
300.00	.....	.....	.....	40.10°	
390.00	.....	96	66	39.55°	Slight jerkings in the muscles of the extremities.

Experiment 37.—Dog; weight, 14.572 kilos. *Vagi cut.*

Time. min. sec.	Dose. grammes.	Pulse per min.	Pressure. mm.	Rectal temperature.	Remarks.
.00	.13	198	204	38.89°	
.23		.....	.....	.....	Tetanus, accompanied by a fall of pressure.
1.50		156	124	.....	Only jerkings in muscles.
2.52	.03	156	204	.....	
3.20					
3.43	.03	.....	.....	.....	
4.07					
5.00	.03	144	224	39.06°	Slight jerkings in hind legs.
.27					
6.00	.03	.....	.....	.....	
.13					
10.00	.06	126	182	39.86°	Occasional slight twitchings.
12.08					
15.00	.03	98	126	39.92°	
.32					
20.00	.05	90	110	39.92°	Occasional slight twitchings.
.21					
30.00	.....	87	128	.....	Strong electric current applied to ischiatic has no obvious effect on blood-pressure or muscles.
35.00	.1	96	152	38 75°	
36.42					
37.00	.....	85	84	.....	
60.00	.....	78	108	38.72°	Absolutely quiet.
90.00	.....	84	126	38.69°	Slight twitchings.
110.00	1.1	96	38	38.32°	This quantity of strychnine was given in divided doses.
270.00					

Experiment 38.—Dog; weight, 17 kilos.

Time. min. sec.	Dose. grammes.	Pulse per min.	Remarks.
.00	.04	180	
.20		.....	Tetanus, with rise of pressure.
.55		66	*Cut both vagi.*
.60		168	
1.20		150	
1.40		132	
2.00	.....	.....	Strong electrical current to the peripheral end of right vagus causes very slight inhibition of the heart-beat.
5.00	.03	.....	
6.00	.....	.....	Vagi absolutely paralyzed.

Experiment 39.—Dog; weight, 11.8 kilos. *Cut vagi and spinal cord in the upper cervical region; curarized.*

Time. min. sec.	Dose. grammes.	Pulse per min.	Pressure. mm.	Remarks.
.00	.15	102	44	
.53				
1.00	.....	90	44	
.10	.15	.....	...	
.50				
2.00	.....	102	36	
9.00	.....	75	42	Very strong electrical current applied to peripheral end of right vagus is without effect.
14.00	.....	66	38	
24.00	.....	66	38	Repeated the last observation, with the result of diminishing the height of the pulse-curves and slightly *increasing* the frequency of the beat.
30.00	.....	60	37	Stopped artificial respiration; pressure fell.

Thus, it is evident that, instead of being excited, it is depressed or paralyzed. That both the excito-motor and automatic-motor ganglia are depressed, chiefly the former, has been shown by the experiments both of Steiner and Klapp. That the muscle is not appreciably effected is positive in the fact that, after the induction of the stage of complete paralysis, prodigious doses of the poison may be injected without eliciting any signs of its failure; indeed, the heart-muscle is almost the last part of the economy to succumb. In fact, it seems likely that the muscle is to some extent stimulated, for, it will be remembered, that the high pulse-curves, while associated with a slow heart-beat, were not always proportionate to the decrease in the rate, or, in other words, simply due to the greater filling of the viscus with blood. The force of the systole is enormously augmented; and, as far as our knowledge goes, this can only occur from the distention of the heart acting as a direct stimulus, or by a direct stimulation of the muscle, or both. It seems that both factors are active in this instance.

The Arterial Pressure.—During the stage of excitement it was found that the pressure rose rapidly coincidently with the onset of convulsions, and that the two phenomena were independent. This was followed by a fall as death approached. In studies of the actions during the stage of paralysis, we find that, after the invariable occurrence of the primary rise, the subsequent changes are of a somewhat uncertain character. The explanation of this is not far to seek. It has already been shown that the primary increase is due to a stimulation of the vaso-constrictor centres in the medulla oblongata, and that the subsequent fall was partly due to their paralysis. These mutations of pressure do not occur after section of the spinal cord, by which the vaso-motor centres in the medulla are destroyed; and, as a consequence, they must be due to actions on those centres. The variable effects must then be dependent upon similar vicissitudes of the actions of the poison on these parts, sometimes the stimulant and at others the depressant action being present. As for instance, in Experiment 31, the primary stimulant action is manifest in a decided increase. This was followed by a reaction (perhaps over-stimulation, or, in some cases, accountable in a transient inhibition of the heart's action), which sent the pressure down, and this, in turn, by a rise, which was decided and due to the stimulation; and, finally, by a decline, due to paralysis.

In Experiment 32 the primary stimulant action is quickly developed, and remains present until the second dose, which depresses the centres, and thus causes a fall. In Experiment 33 we find virtually the same results as in Experiment 31. While in Experiment 34, in which the dose was excessive, the stimulant action is so slight and transient as to be almost unnoticed, while the depressant action is so manifest that the pressure falls to a point which indicates complete paralysis of the centres. Compare the pressure in this experiment with that in Experiment 39, in which the vaso-motor centres in the medulla oblongata were destroyed by section of the cord.

During the existence of this condition of motor paralysis, powerful stimulus may be applied to the ischiatic or sciatic nerve without eliciting any evidence whatsoever of the functional integrity of the fibres. Moreover, the production of asphyxia fails absolutely to cause any rise in pressure, even though the condition of the pressure at the time shows that the vaso-constrictor centres remain active. The effect of asphyxia in this connection has been frequently referred to in the records of many of the experiments scattered throughout the paper, the same result invariably being observed. Even when the vaso-motor centres are in a condition of stimulation, as in Experiment 40, a rise does not occur when asphyxia is produced.

In this experiment it will be observed that at the twenty-seventh minute the pressure was 238 millimetres, the normal being 154, yet not as high as immediately after the beginning of the injection, when it reached 260 millimetres. Asphyxia, now being produced, was followed by a fall. Artificial respiration was resumed, and after the pressure recovered asphyxia was again produced, with the same effect on the pressure. We have demonstrated here a condition of the vaso-motor centres heretofore unknown, one in which they remain functionally capable, yet have lost their power of being excited by the blood deprived of its oxygen and loaded with CO_2. The explanation of this is possibly in a chemical combination of the strychnine with the protoplasm of the vaso-motor cells, thus preventing the action of the altered blood.

The Sensory and Motor Nerves.—During the stage of paralysis, strong electrical currents may be applied to the sciatic or other mixed nerve without inducing any effects whatsoever. The motor fibres, while being

Experiment 40.—Dog; weight, 9.514 kilos.

Time. min. sec.	Dose. grammes.	Pulse per min.	Pressure. mm.	Remarks.
.00		120	154	Pulse-curves 7 millimetres high.
.14		.....	260	Tetanus.
.20		108	138	Pulse-curves 10 millimetres high.
.40	.2	.....	10	The heart-beat was completely inhibited for 29 seconds, then gave one beat, then arrested for 13 seconds, then one beat, then arrested for 5 seconds, after which it beat without long diastolic intervals.
1.30				
4.00		48	30	Pulse-curves 24 millimetres high.
5.00	.....	.....	.....	Strong current applied to right vagus (intact) is without effect other than to lessen the height of the pulse curves to 10 millimetres and increase the pulse to 52.
10.00	.....	69	108	Pulse-curves 24 millimetres.
15.00	.....	105	240	Pulse-curves 19 millimetres.
27.00	.....	99	238	Artificial respiration was now discontinued; no change in pressure occurred for 42 seconds, then a steady fall set in, attended with stronger heart-beats.
29.00	.....	.....	.....	Artificial respiration begun.
34.00	.....	.....	.....	Repeated the last observation with identical results.
36.00	.....	.....	.....	Applied strong faradic current to right vagus; no effect, but a lowering of the height of the pulse-curves (from 22 millimetres to 7 millimetres), and an increase of the pulse-rate from 60 to 67.

absolutely inexcitable to electrical stimulus, are still able to convey impulses, as is evident in the occurrence of twitchings which are of spinal origin, which occur simultaneously in the legs, and cease after section of the nerves. This curious condition of the nerve may also be caused by other poisons or circumstances.

The Muscles.—These structures do not seem in the least affected from a direct action of the poison, unless after enormous doses.

The Blood.—These large doses darken the blood and greatly interfere with its power of absorbing oxygen. No amount of air can be forced into the lungs sufficient to restore the scarlet hue of normal arterial blood. The spectroscope does not reveal else than the spectrum of oxyhæmoglobin.

The Temperature and Heat Processes.—The effect on the animal's temperature is greater during this stage than in the preceding, unless in the stage of excitement, when the rise was affected by convulsions. Temperature records were made in Experiments 31, 32, 33, 34, 36, and 37, and, with the exception of Experiment 34, a marked rise occurred in each. The time of the maximum increase differs widely, varying from fifteen minutes to two hours and forty minutes. In one experiment, not recorded in this paper, the rise was steady for three hours and twenty-three minutes, up to the time of death, when the temperature reached 41.53° C. The increase in the above experiments were, respectively, .49°, .40, .52°, .89°, and 1.03°, or an average of .67°. With the exception of the one experiment just alluded to, the rise of temperature was always followed by a fall to the normal, or to a point below it. In Experiment 34, in which relatively an enormous dose was given, the temperature did not go above the normal at any time, but fell far below this point.

The following experiments were performed by the aid of the calorimeter, in order to determine the means by which the changes in temperature are effected. The heat units are in kilogramme degrees, and the thermometric readings in the Centigrade scale. The doses were not in any case excessive, as is apparent in the appearance of twitchings or jerkings during the first hour after the injection of the paralytic dose. By a reference to the accompanying "foot-notes" the general condition of the motor apparatus at the terminations of the different hours is suggested, also the times of giving subsequent doses.

An examination of the records of these experiments will show that in every one, with the exception of Experiment 46, a rise of temperature occurred during the first hour after giving strychnine, this increase usually being noted also during the second hour. In some of the experiments heat production was increased during these periods, but in others it was diminished. In Experiments 41, 42, and 45 the mean heat production for these two hours was in excess of that in normal animals during the preceding periods, while in Experiments 43, 44, and 46 it was less. Heat dissipation was diminished in every ex-

Experiment 41.—Dog; weight, 11.327 kilos.

	Hourly heat production.	Hourly heat dissipation.	Rectal temperature, C°. Beginning of hour.	Ending of hour.	Gain or loss (+ or —).	Mean room temperature.
First hour before strychnine	30.633	32.525	39.29°	39.08°	— 0.21°	17.0°
Second hour before strychnine	31.023	35.100	39.08°	38.63°	— 0.45°	19.9°
*First hour after strychnine	35 781	32.700	39.68°	40.02°	+ 0.34°	20.3°
*°Second hour after strychnine	32.500	31.050	40.02°	40.18°	+ 0.16°	20.2°
Third hour after strychnine	30.257	32.975	40.18°	39.88°	— 0.30°	20.1°
†Fourth hour after strychnine	28.060	25.795	39.88°	40.13°	+ 0.25°	20.6°

Experiment 42.—Dog; weight, 10.9 kilos.

First hour before strychnine	44.982	47.075	39.36°	39.12°	— 0.24°	19.5°
Second hour before strychnine	44.483	46.575	39.12°	38.88°	— 0.24°	18.3°
†°First hour after strychnine	51.451	44.475	39.43°	40.23°	+ 0.80°	19.8°
*°Second hour after strychnine	43.152	36.525	40.23°	41.09°	+ 0.76°	20.8°
*°Third hour after strychnine	37 476	37.225	41.09°	41.12°	+ 0.03°	21.2°
*Fourth hour after strychnine	29.026	32.775	41.12°	40.69°	— 0.43°	20.5°

Experiment 43.—Dog; weight, 13.605 kilos.

First hour before strychnine	40.943	38.875	38.96°	39.15°	+ 0.19°	18.8°
Second hour before strychnine	44.163	44.925	39.15°	39.08°	— 0.07°	19.0°
First hour after strychnine	32.334	28.525	39.24°	39.59°	+ 0.35°	20.5°
Second hour after strychnine	23.853	25.050	39.59°	39.48°	— 0.11°	20.9°
*Third hour after strychnine	21.820	22.475	39.48°	39.42°	— 0.06°	20.7°
††Fourth hour after strychnine	28.633	25.050	39.42°	39.74°	+ 0.32°	20.9°
††Fifth hour after strychnine	33.447	30.400	39.74°	40.02°	— 0.28°	20.4°

Experiment 44.—Dog; weight, 11.8 kilos.

First hour before strychnine	33.030	36.900	39.15°	38.74°	— 0.41°	16.0°
Second hour before strychnine	44.039	43.850	38.74°	38.76°	+ 0.02°	16.8°
†°First hour after strychnine	28.631	24.950	39.64°	40.03°	+ 0.39°	18.2°
*°Second hour after strychnine	44 994	32.250	40.03°	41.38°	+ 1.35°	18.0°
Third hour after strychnine	20.360	24.325	41.38°	40.96°	— 0.42°	18.4°
†Fourth hour after strychnine	21.090	28.075	40.96°	40.22°	— 0.74°	19.4°

Experiment 45.—Dog; weight, 9.44 kilos.

First hour before strychnine	42.002	41.625	38.94°	38.98°	+ 0.04°	20.5°
Second hour before strychnine	36.206	37.150	38.98°	38.88°	— 0.10°	21.4°
*°First hour after strychnine	46.584	24.400	39.13°	41.48°	+ 2.35°	21.5°
*First hour after *cocaine*	30.636	23.650	41.48°	42.12°	+ 0.74°	22.0°
Second hour after *cocaine*	18.655	23.375	42.12°	41.62°	— 0.50°	21.7°

Experiment 46.—Dog; weight, 10.231 kilos.

First hour before strychnine	36.032	37.750	39.29°	39.08°	— 0.21°	18.5°
Second hour before strychnine	38.573	38.000	39.08°	39.15°	+ 0.07°	20.0°
*°First hour after strychnine	23.433	27.525	38.92°	38.42°	— 0.50°	20.7°
*°Second hour after strychnine	15.332	22.225	38.42°	37.59°	— 0.83°	20.7°
First hour after *cocaine*	12.722	20.825	37.59°	36.60°	— 0.99°	20.5°

° Injected strychnine subcutaneously.

periment. The fact that the diminution of heat dissipation is a constant effect, and that heat production may be increased or decreased, certainly leads to the conclusion that the rise of temperature during the stage of paralysis is due essentially to the diminution of heat dissipation, but which may accidentally be assisted by an increase of heat production.

It is probable that the variable effects in the quantity of heat produced are dependent upon a number of factors. During the stage of excitement it was found that the increase of temperature was due to an increase of heat production. The action was, however, a weak one, and it seems quite likely that paralytic doses may sometimes act as an excitant and at others as a depressant. There can be no doubt that heat formation is sometimes depressed, as, for instance, during the first hours in Experiments 43, 44, and 46, especially in the last two; and it is not clear that the diminution is in any degree dependent upon the decrease in heat dissipation, because the quantity of heat produced is sometimes in excess of that dissipated, which should not be the case were there a dependency. Moreover, that strychnine does finally depress thermogenetic centres becomes obvious in the enormous and rapid decrease in heat production after the injection of excessive doses. The diminution of heat production cannot be due to motor palsy, because in most of the experiments twitchings or jerking were noted throughout, notwithstanding the condition of thermogenesis.

It is quite possible, as in Experiment 41, to keep an animal in this curare-like condition for hours and yet maintain the heat processes in a practically normal state.

Cocaine is the most powerful of all agents which increase heat production and bodily temperature. In dogs *lightly* curarized it has been found that the function of thermogenesis is not for a time impaired, although it finally fails, owing to the indirect effect of the excessive loss of heat. In such animals I have found that the injection of cocaine in doses sufficient to cause profound effects in normal dogs absolutely failed to effect an increase of heat production, and consequently to increase the bodily temperature. Cocaine was injected in Experiments 45 and 46 at the end of the first hour in each, after giving the strychnine. The dose in each was .02 gramme to the kilo of body-weight. It will be observed that neither temperature nor heat production was increased; in fact, if there was any effect, it was in the opposite direction. In a number of other experiments, not calorimetrical, cocaine was injected, but in no case when the animal was thoroughly strychnized did a noticeable rise of temperature occur.

Strychnine doubtless acts like curare on the thermogenetic apparatus. It leaves intact the automatic heat-producing centres and paralyzes accelerator heat-producing centres, upon which latter, presumably, cocaine acts. The increase of heat production following small doses of strychnine may be due to a primary stimulation of either of these hypothetical centres; but certainly after paralytic doses such an increase seems attributable solely to a stimulation of the automatic centres. After excessive doses not only are the accelerator thermogenetic centres paralyzed, but the automatic centres are depressed and heat production thus lessened.

In conclusion, during the stage of excitement, thermogenesis is increased, and thus bodily temperature is similarly affected. During the stage of paralysis, heat production may be slightly increased or diminished, the increase being due to a stimulation of the thermogenetic centres, and the decrease to their depression; the rise of temperature during the stage of paralysis is due to a diminution of heat dissipation, although there may be an increase of heat production to assist.

General Remarks.—When we consider the minute quantities of strychnine required to kill, it is astonishing what enormous doses may be injected directly into the circulation without fatal effect if artificial respiration is maintained. The minimum lethal dose for the normal dog is about .0002 gramme ($\frac{1}{3000}$ grain) for each kilogramme of body-weight, so that a dog weighing 28.4 kilos would require but .00568 gramme ($\frac{1}{12}$ grain) to cause death within a short time. Such an animal would need from .25 to .50 gramme to induce complete motor paralysis, yet after such a dose the drug may almost be given *ad libitum*. In Experiment 31 the dog weighed 21.8 kilos, and the quantity injected was 1.3 grammes; in Experiment 35 the dog weighed 41 kilos, and the quantity injected was 3.87 grammes; in Experiment 36 the dog weighed 36.28 kilos, and the dose was 1.6 grammes; and in Experiment 37 the dog weighed 14.57 kilos, and the total quantity injected was 1.58 grammes. The average weight was 28.41 kilos, and the mean quantity injected was 2.09 grammes. The largest dose relatively was in Experiment 35, in

which the dog weighed 41 kilos, and the dose was 3.87 grammes, or nearly 60 grains, yet, after all this, the animal was far from being dead.

The Curare-like Action of Strychnine.—The apparent similarities between the paralytic states in curarized and strychnized animals has already been referred to, but a close study of them shows that the resemblance does not extend to any important degree beyond the loss of voluntary movement; indeed, the many dissimilarities are at once striking. Some of the most important will be seen at a glance by comparing the following parallel columns:

STRYCHNINE.	CURARE.
The *arterial pressure* exceeds the normal immediately after the injection, and continues hypernormal if the dose has not been excessive.	Never, or very rarely, exceeds the normal, but almost invariably depressed.
Asphyxia causes a fall of pressure.	The opposite.
The *temperature* is increased.	Usually the opposite.
Heat dissipation diminished.	The opposite.
Stimulation of a *sensory nerve* does not affect arterial pressure.	Causes a rise of pressure.
Essentially a *motor* poison.	A *sensory* poison.
The *orbital reflex* disappears before the knee-jerk.	The reverse.
The *pupil* may be contracted to a pin-hole size.	Pupils dilated.

From the results of this research the following conclusions are deduced:

1. The minimum lethal dose for dogs when intravenously injected is about .0002 gramme to the kilogramme of body-weight.

2. Doses of from .015 to .02 gramme to the kilo intravenously cause a condition of absolute muscular quiet, and by means of artificial respiration the animal may be kept alive in excellent general condition.

3. Quantities in excess of .094 gramme to the kilo may be injected intravenously in divided doses without causing death, provided artificial respiration is practised.

4. The toxic action of this remarkable substance is so directed to the motor cells in the spinal cord that the minimum poisonous dose is exceedingly small, owing to the production of asphyxia or exhaustion by the violence and persistence of the tetanic seizures. Should artificial respiration be maintained, nearly five hundred times the minimum fatal dose may be injected without causing death.

5. By a proper regulation of the size of the dose and the method of administration, the stage of excitement may be prolonged over an almost indefinite period, or may be so brief as to last for but a few seconds.

6. During the stage of excitement the following effects and actions are observed:

a. The motor disturbances and convulsions are of spinal origin.

b. The sensory nerves and muscles are unaffected.

c. The motor nerves, after the onset and continuance of convulsions, become depressed from overwork.

d. The pulse-rate is first lessened in frequency, then increased, and finally diminished, the first effect being due to a stimulation of the cardio-inhibitory apparatus, the second to its depression, and the last to a depression of the excito-motor or automatic-motor ganglion in the heart.

e. The arterial pressure is primarily diminished, then greatly increased, and at last diminished, the first effect being due to some obscure action on the vaso-motor centres in the medulla oblongata, the rise to a stimulation of the vaso-constrictor centres in the same part, and the final fall to a depression of the heart and vaso-motor centres.

f. The respiration-rate is not specifically affected unless it be decreased, or during the period of convulsions, when it may be decidedly increased.

g. The bodily temperature is increased, this being due to an increase of heat production, which is to some extent independent of the motor excitement.

7. During the stage of paralysis the following points are noted:

a. The muscles do not seem in the least affected.

b. The sensory nerve-fibres are inexcitable to strong electrical currents.

c. The motor nerves do not respond to strong electrical stimulus, although they may transmit impulses from the nerve-centres.

d. The pulse-rate is reduced, but the height of the curves increased, the first effect being due to a depression of the motor ganglion in the heart, and the second to the greater filling of the viscus with blood, and perhaps to a direct stimulation of the muscular substance.

The cardio-inhibitory fibres are paralyzed, but no increase in the frequency of the pulse-rate is observed, owing to the predominance

of the depressant action on the heart ganglia. Stimulation of the vagi causes smaller pulse-curves and a slight increase in the frequency of the beats.

e. The blood-pressure is increased, unless the dose has been greatly in excess, when it is diminished. The increase is due to a stimulation of the vaso-motor centres in the medulla oblongata, and the decrease to a depression of the heart and vaso-motor palsy.

In non-curarized animals the pressure sinks below the normal within a few minutes after the tetanic paroxysm, but in those curarized this depression is less marked, and the stimulant action on the vaso-motor centres is stronger.

Asphyxia, or electrical stimulation of sensory nerve, is unable to cause a rise of pressure as in the normal animal, the former always inducing a fall.

f. The hæmoglobin is in some way affected, so that it cannot be oxygenated to the normal degree. The spectroscope reveals nothing but oxyhæmoglobin.

g. The sensory and motor nerves seem absolutely inexcitable to strong electrical stimulus, although the latter may be capable of conveying impulses from the nerve-centres to the muscles.

h. The temperature is increased, owing chiefly to a decrease of heat dissipation. Heat production may be slightly increased or decreased.

Cocaine is unable to cause a marked increase of heat production and temperature, as in the normal animal.

Apparently strychnine in paralytic doses paralyzes the hypothetical accelerator heat-centres, and leaves intact the automatic heat-centres.

i. The paralytic condition caused by large doses of strychnine resembles that produced by curare, but is in many important ways entirely distinct.

TREATMENT OF ERYSIPELAS.

SCHNEIDER (*Centralblatt für Chirurgie*, No. 1518, 1892) states that he has employed Sachs's treatment for erysipelas with almost invariable success. This consists in applying beyond the involved areas a ten per cent. ichthyol collodion mixture. If the extremity is involved, this collodion is spread around the limb above the limit of the disease, forming a band about twice the breadth of the hand. It should be put on in a layer so thick that after drying it presents an appearance as though the limb were encircled with a broad bandage. In nearly all cases when the inflammation reached the border of this collodion layer it ceases to spread.

Improvement follows in two or three days, the temperature drops, and symptoms rapidly subside.

Schneider believes that collodion without ichthyol is as efficacious as the mixture suggested by Sachs.

A DEPILATORY POWDER.

According to the *Bulletin of Pharmacy* for February, 1892, the following is a useful depilatory powder:

℞ Sulphide of barium, 50 parts;
Starch,
Oxide of zinc, of each, 25 parts.

This is mixed with water so as to form a soft paste and spread upon the face. In ten minutes' time it is scraped off and the skin is now found to be smooth.

FORMULA FOR THE TREATMENT OF BURNS.

According to *L'Union Médicale* for January 14, 1892, NIKOWSKY recommends the following treatment in burns:

℞ Tannic acid, ʒiiss;
Alcohol, ʒiiss;
Sulphuric ether, ℥iiss.

Sig.—Make a solution, and apply locally in cases of burns of the second or third degree. Wash the part with a solution of boric acid, puncture the blebs, and apply by means of a camel's-hair pencil the solution of tannic acid just named. Cover the part with cotton wadding.

A RESOLVENT GLYCEROLE.

L'Union Médicale for December 24, 1891, recommends the following prescription as an application to be placed over strumous glands at the same time that cod-liver oil is taken internally with a tonic and stimulant treatment:

Iodoform, gr. xxx;
Balsam of Peru, iss;
Glycerin, ʒvi.

The Therapeutic Gazette

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Leading Articles.

THE THERAPEUTIC USES OF OXYGEN.

WHEN a member of the medical profession, by original work, by valuable medical writings, or by other means, places himself above his fellows in the treatment of disease, it is but natural that anything which he may write will be received by those who are familiar with his name as valuable and reliable therapeutic evidence.

As a consequence, when Dr. Brunton published in the *British Medical Journal* a short note, detailing the good results which he had obtained in the administration of oxygen to a patient who was at death's door from pneumonia, the medical journals throughout England and America hastened to abstract his article, and to endorse in every way that they could the recommendation of so eminent an authority.

Probably reiteration of valuable facts in medical literature can never be carried to excess, because there are always some members of the medical profession who have not received, or have failed to note, some points in therapeutic progress. Yet it strikes those of us who have practised medicine for any length of time in America that the results which have been published by Dr. Brunton are nothing more than those with which we have been familiar for a number of years. Certain it is that oxygen is being more widely employed every day and in the treatment of a large number of ailments. Indeed, its sphere of usefulness has been extended, until it includes not only those diseases associated with interference with respiration and consequent partial or complete asphyxia, but also those conditions in which it is evident that the vital processes are carried on feebly or too slowly. Thus, a popular use of oxygen gas in this country is its administration in cases of anæmia.

A series of researches, carried out several years ago by two of the editors of the GAZETTE, indicated very strongly that oxygen gas was of the greatest possible value in the resuscitation of persons asphyxiated by ordinary coal- or illuminating gas, it being possible to revivify animals apparently dead by the forced inspiration of oxygen. It seems, however, when we consider the matter rationally, that the value of oxygen as a remedy has the same distinct limitations which govern the employment of almost all other agents possessing curative powers. It is well known that the hæmoglobin of the blood will not take up more oxygen than is in the ordinary atmosphere, and it becomes a matter of grave doubt whether, in cases of anæmia or other disorders of the general system, inhalations of oxygen produce any effect whatever, except through the increase in respiratory activity of the patient, who voluntarily fills and empties his chest thoroughly while using the oxygen apparatus. It may be, however, that advantages are obtained by its employment in these conditions, and it will require further clinical experience to determine whether the oxygen itself has any direct effect under these circumstances.

In pneumonia, however, the rationale of the employment of oxygen is entirely correct, provided the right side of the heart is not so engorged as to prevent it from doing its work. The main danger that threatens the patient is asphyxia, or failure of respiration, owing to the consolidation of a large area for breathing. It becomes evident that if

one lung is so consolidated that respiration must be carried on entirely with the other, this remaining lung must take in double the quantity of air which it usually contains in order to provide the general system with its ordinary quota of oxygen. It also necessitates a large increase in the area of the blood-vessels, through the walls of which the gaseous interchanges of respiration take place, and it is perfectly just to suppose that the admixture of an increased quantity of oxygen with atmospheric air under these circumstances will permit the hæmoglobin in the red blood-corpuscles to change into at least an approximate normal amount of oxyhæmoglobin. Oxygen is probably of great value under all circumstances where asphyxia is present through the imperfect oxidation of the blood.

THE USE OF BROMIDE OF ETHYL AS AN ANÆSTHETIC.

IT seems to be a characteristic of the medical profession that they seize upon new remedies with great avidity, and discard many of them with an equal readiness. The fact that chloroform and ether both of them possess many disadvantages as anæsthetics, lead to the enthusiastic welcome of the bromide of ethyl by a large number of physicians and surgeons within the past decade. In this city, and indeed pretty much through the entire United States, it was widely employed for a short space of time. The publication of a number of accidents under its use, and the results obtained by its administration to animals, did much to decrease its popularity, so that at one time its use became practically obsolete. During this period, in which the usefulness of bromide of ethyl seemed to be in doubt, a number of surgeons persisted in its employment. The readers of the THERAPEUTIC GAZETTE are fortunate in the translation for this number of the history of a large number of cases to which the drug has been given in Germany within recent years, and in reading the article of Dr. Montgomery, Professor of Gynæcology in the Jefferson Medical College, who has given the drug in over five hundred cases of labor without a single fatal result and with only one or two unfavorable effects,—as good results as could be gotten by the employment of either ether or chloroform under such circumstances in an equal number of cases. The fact that this drug does not produce the nausea and vomiting so apt to follow the administration of ether, that when carefully used it does not tend to produce the sudden cardiac failure characteristic of chloroform, and, finally, that its odor is fairly agreeable to the patient urges us to further careful trials ere we decide finally that it is not to be employed. It seems particularly necessary that the surgeon should remember its applicability to short operations rather than to those which are prolonged, and, as is pointed out elsewhere, the method of its administration should be carefully attended to. Instead of being given in small doses, thoroughly diluted with air, it should be given in concentrated vapor, as much as half a drachm to a drachm being poured upon the inhaler.

ON GLAUCOMA AFTER DISCISSION OF SECONDARY CATARACT.

IN recent times a good deal of attention has been directed to glaucoma in aphakial eyes,—that is to say, to an attack of increased intraocular tension following extraction of the crystalline lens, either by the simple or combined operation, and prior to any secondary interference. Less commonly glaucoma develops as the result of an operation for the relief of after-cataract. The proper treatment of such an accident is the subject of a communication by Knapp, in the *Archives of Ophthalmology* for April, 1892.

Knapp is unwilling to commit himself to any explanation of the pathogenesis of glaucoma under these circumstances. In the ten cases which he quotes there were no complications save in one, except that a few had non-inflammatory posterior synechiæ where the capsule had been opened. He is evidently disposed to believe that certain persons have a predisposition for glaucoma, and is strengthened in this view because one of his patients developed glaucoma in both eyes after discission. The well-known liability of the Jewish race to glaucoma is another fact which adds some weight to the predisposition theory, or, rather, to a theory which declares that glaucoma is more likely to occur in people with nervous constitutions and temperaments.

The method of opening the capsule may possibly, in the opinion of this operator, have had some influence upon the outbreak of glaucoma. Touching this point, the following are Dr. Knapp's exact words: "During the last years I have made the division of the capsule more extensive than I used to do. Instead of splitting the capsule in the shape

of a T, I did it in the shape of a +, making at first a horizontal incision, then passing the knife up before the upper part of the capsule, transfixing this, and cutting from above down into the horizontal section; then I split the lower half of the section in a similar way from below upward. This method produces unimpeachably clear pupils, and the result of such operations cannot be excelled. Yet the occurrence of glaucoma has made me return to the T-shaped discission, and I take care not to enter the blade of the little knife more deeply into the vitreous than is necessary for a sufficient opening in the capsule."

When glaucoma occurs after a discission, judging from the series of cases which are reported in this paper, it is characterized by pain, swelling of the lids and conjunctiva, haziness of the cornea, bulging of the periphery of the iris, increase of tension, impairment of vision, and sometimes general disturbances and vomiting.

Necessarily three means of treatment present themselves,—namely, the instillation of eserine or pilocarpine, iridectomy, and sclerotomy or paracentesis. There is no doubt that under certain circumstances the persistent use of eserine or pilocarpine will bring about recovery without operative interference. This was the case in one of Knapp's series, and in those cases which are analogous to glaucoma in so far as there is an increase of tension, but which probably depend upon, or, at least, are associated with, symptoms of irritation in the ciliary body, the untoward symptoms are controlled by eserine and pilocarpine, and an operation is unnecessary.

Judging from a favorable experience, Knapp recommends that iridectomy should be performed whenever myotics do not promptly and satisfactorily relieve an attack of acute glaucoma after discission. The iridectomy should be made upward with a lance-shaped knife and a blunt hook. The incision is to be placed somewhat behind the corneal section, and should not be very broad. The blunt hook is preferred to the iris forceps, because the latter do not readily grasp the iris under these circumstances. In all of Dr. Knapp's operations, normal vitreous, which partially filled the anterior chamber, flowed out. It had no influence upon the healing of the wound, and he refers to the point very particularly, because, in his experience, there need be no dread if this accident occurs. The question whether paracentesis or sclerotomy is advisable in these cases is unanswered, for the simple reason that Dr. Knapp is unwilling to experiment with these operations when experience has given him satisfactory results with a method which is at once reliable and easy of performance,—namely, iridectomy. The important fact should not be forgotten that this operation is to be done early, promptly, and with good hope of success. Myotics are to be used only as a temporary matter, and it is wiser not to place reliance upon the hope that they may ultimately cure the difficulty.

THE NECESSITY FOR PROLONGED TREATMENT AFTER BILATERAL EPIDIDYMITIS.

THERE is a popular belief among physicians to the effect that gonorrhœal epididymitis, if at all severe, forever prevents the discharge of spermatozoa from the testicle of the affected side, and that if both sides are involved in this inflammation the patient will remain sterile, though there may be no alteration in his sexual appetite or ability. This belief is founded on the statement of Godard, who, in 1857, stated that he examined the semen of thirty patients who had suffered from bilateral epididymitis, and that spermatozoa were absent in all. Liégeois, of eighty-three cases, could find spermatozoa in but eight. J. William White, of a hundred and seventeen cases, noted restoration in but thirteen. Rollet, Bumstead, Jullien, and Furbringer all state that the appearance of spermatozoa in the semen after double epididymitis is the exception, and Monod and Terrillon state positively that in these cases spermatozoa are not observed. Against these opinions may be quoted that of Fournier, who states that the obliteration of the spermatic duct incident to epididymitis is temporary in the vast majority of cases, while Hardy holds that, after a period of time varying from two months to two years, such patients are able to procreate, sterility in reality being an exceeding rare sequel of double epididymitis.

It seems perfectly clear, in the effort to reconcile these conflicting statements, that the immediate effect of a severe double epididymitis is to cause disappearance of the spermatozoa from the semen; it is also evident that the disappearance may be permanent, since many cases of sterility are recorded, the patients reporting for examination months or years after the original double epididymitis. It is certain that not all of these

cases remain sterile, and that a much larger percentage than statistics would show regain full power, since, when this is the case, the physician has no further opportunity of making an examination; while, when sterility results, the patient is almost certain to present himself for professional advice. The question as to the percentage of cases in which recovery is complete, and the percentage in which sterility results, can be settled only by prolonged clinical observation of a large number of cases of double epididymitis. Balzer and Souplet (*Annales de Dermatol. et de Syphilograph.*, tome iii., May, 1892), in the hope of rendering knowledge upon these points more definite, have contributed the results of examinations made upon forty six cases of double epididymitis. They consider all cases recent in which examination of the sperm was made less than six months after the double epididymitis. Of thirty-four such examinations, spermatozoa were found in but three. Six old cases, in which examination was made more than six months after the last attack of epididymitis, showed spermatozoa in five. This result apparently confirms the statement of Gosselin, who wrote that obliteration of the ducts may continue for a variable period; it may disappear in three, four, five, or eight months, allowing the spermatozoa to escape; indeed, it is not possible to set a limit as to the time after which recovery is impossible. In some of the recent cases examined by Balzer and Souplet, spermatozoa had disappeared six days after the beginning of the inflammation, a result not in accordance with the teaching of Monod and Terrillon, who state that in double epididymitis spermatozoa persist in the semen for two or three weeks from the beginning of the attack.

In accordance with the findings of Balzer and Souplet are the results of my own examinations of the semen of patients who suffered from double gonorrhœal epididymitis. Eight old cases examined showed spermatozoa in seven. All the recent cases showed absence of spermatozoa, and this was observed in two instances, even though the disease was unilateral. In addition to the eight old cases examined, simply because they gave a history of double epididymitis, and not because of any complaint on their part, three more old cases were examined on account of supposed sterility, their wives never having conceived. All these patients were sterile, and all gave a history of bilateral epididymitis. It is interesting to note that this experience is paralleled by that of Balzer and Souplet, who examined the semen of five men referred to them by Fournier from his private practice, probably on account of suspected sterility. In the discharge of none of these patients were spermatozoa found.

The practical application of these facts is that patients should be told when suffering from an attack of double epididymitis that they will be temporarily sterile, but that the power of impregnation will probably return; that there is a possibility that sterility may be permanent, hence, should an unfruitful marriage take place, the semen should be examined before subjecting the woman to treatment at the hands of the gynæcologist; and, most important of all, that treatment should be continued until microscopic examination shows that spermatozoa are again present in the semen.

It is safe to assume that in the great majority of cases epididymitis is treated only during the acute symptoms; that with the disappearance of pain and marked swelling the suspensory bandage is thrown aside, and all efforts towards restoring the full functional power of the testicle are abandoned. It is clear from the figures quoted that spermatozoa are not found in the semen for many months after even a mild attack of inflammation; this shows that repair is not complete. It is fairly well proven, moreover, that the majority of cases recover in spite of neglect of prolonged treatment, but that a percentage sufficiently large to make the prognosis guarded in each individual case remain sterile. The dependent position of the testicle, the arrangement of its circulation, and particularly of the venous return, render it and its adnexa particularly liable to chronic inflammation and resultant fibroid changes. After the acute inflammation has passed, the tendency to passive congestion will remain, and if not corrected by appropriate treatment, may well produce alteration not only in the ducts but in the glandular substance of the testicle as well.

Hence it is of cardinal importance that these patients should not be discharged as cured until there is complete functional restoration. The treatment appropriate to the beginning of the attack is appropriate to all its stages. This consists in the application of the means found to be most potent in combating inflammation in any part of the body. Rest, elevation, pressure, heat, moisture, all are potent agents in overcoming either acute or chronic inflammation; when aided by the

external and internal administration of absorbents they are still more efficient.

The treatment of a case of gonorrhœal epididymitis, either single or double, should be conducted on the following plan:

Mercury ointment should be applied to the scrotum; over this a layer of absorbent cotton; and, finally, a pressure suspensory bandage, made of mackintosh or other air-tight material, so that it will keep the scrotum constantly moist, and provided with lacings at the sides, so that it can be made to supply even, uniform pressure. In addition, small doses of iodide of potassium, 3 to 5 grains, should be taken internally. This treatment should be continued day and night for months, or even years, in case there is not before this time restoration of function.

The presence or absence of the nodular infiltration of the epididymis seems to give no reliable indications as to whether or not the ducts are patulous, though its steady disappearance under treatment is always an encouraging sign. The only reliable test is afforded by occasional microscopic examination of the semen, and the patient should not be discharged till the fluid is found swarming with living, well-formed spermatozoa, which retain their vitality when kept warm, and supplied with plenty of mildly alkaline fluid for from twelve to twenty hours.

Reports on Therapeutic Progress.

LABYRINTHINE DEAFNESS TREATED BY PILOCARPINE.

During the last few years a number of papers have been published detailing cases of deafness treated by the use of pilocarpine. In the *British Medical Journal* for April 2, 1892, is a paper by FIELD, of London, in which he details the results of his use of the drug.

His method of administration is to inject into the back of the arms a solution of the nitrate of pilocarpine, of a strength equal to ⅓ grain to 10 minims. The dose at first is $\frac{1}{12}$ grain, gradually increased to ⅛, and, if this is well borne, to ¼. Diaphoresis and salivation rapidly manifest themselves, and it is well to give a little ammonia in order to prevent the depression consequent upon the action of the drug. The patient is then made to lie on a sofa, and is well covered with rugs, the head being enveloped in a shawl. These wraps are very carefully removed by degrees, in order to prevent catching cold. Untoward symptoms are not to be feared if small doses are used at first. The author is very positive that pilocarpine only does good to a certain set of cases, and gives the following rules for determining its indications:

1. The case must first be carefully diagnosticated as actually one suitable for treatment with the drug. Labyrinthine deafness, it must be remembered, is not a disease of common occurrence.

2. The larger number of the patients that hear better in a noise (when in a train or omnibus, for example) do not derive much, if any, benefit from pilocarpine, if used independent of other remedies.

3. The best test of hearing is to employ a large tuning-fork with a wooden handle, acting as a sounding-piece, to put on the head. Some of the small tuning-forks commonly used are worthless to the aural surgeon.

4. Cases in which the tuning-fork on the forehead is heard indifferently, or scarcely at all, may be suitable for treatment with pilocarpine.

5. Patients with a syphilitic history are usually much relieved, and the possibility of hereditary syphilis in a given case must be borne in mind.

6. The very large number of patients that say they hear worse after a cold are mostly unsuitable cases.

7. Patients who say they can hear when they are spoken to very distinctly, or whose deafness began with a difficulty of discriminating sounds, or who cannot make out general conversation, and hear worse when tired, nervous, or feeling out of health, are more promising cases than the last mentioned.

8. In arriving at a diagnosis, the state of hearing, as tested by the watch and the condition of the drum-head, should be noted.

9. Some cases of marked aural vertigo derive benefit from pilocarpine.

10. If middle-ear disease is associated with mischief in the internal ear, the Eustachian catheter should be passed from time to time for the injection of vapors.

DIGITALIS IN AORTIC DISEASE.

In a previous number of the THERAPEUTIC GAZETTE we quoted DR. BARR's article upon the use of digitalis in aortic disease, which differed from the opinions generally held by the profession, in that he recommended the use of the drug in aortic regurgitation.

In the *British Medical Journal* for April 2, 1892, DR. TAYLOR strongly opposes his state-

ment that the drug is useful in aortic regurgitation, quoting three cases in which the administration of digitalis was disastrous within forty-eight hours of the time it was first given.

DANGERS OF LAVAGE OF THE STOMACH.

In the *Practitioner* of April, 1892, SOLTAU FENWICK, of London, discusses the question of lavage. He points out that attacks of convulsions and tetany have sometimes followed resort to this measure, and also that a number of cases are on record in which syncope and sudden death followed it. He also reports instances in which perforation of the stomach took place, and he has also known gastric hemorrhage to occur.

Besides the other injuries which may follow lavage, he points out that there are other cases on record in which antiseptic materials have been used for washing the stomach, and that as a result death has occurred in this way. This fatality has followed the use of a two per cent. solution of boric acid. The conclusions which he draws are as follows:

At the present day every imaginable symptom that can in any way be connected with the digestive organs is immediately considered as an indication for the use of lavage, and we find that not only are chlorosis, atonic dyspepsia, and the gastric crises of ataxia subjected to this treatment, but even cases of reflex vomiting are supposed by some to necessite the employment of the douche. But it is obvious that in those cases where the treatment fails to do good, it is extremely likely to do harm, since, as Leube pointed out, it has the effect of removing those products of digestion whose manufacture has caused the stomach a considerable amount of labor. For his part he fails to understand how washing out the organ in a case where the normal amount of secretion proves insufficient can possibly increase its digestive powers, or the lavage of the stomach prevent the occurrence of symptoms which are wholly dependent on organic disease in another organ remotely situated. In one case of tabes dorsalis, accompanied by exceedingly severe gastric crises, he washed out the stomach every day for some weeks, and the state of digestion was carefully watched; but beyond the fact that the symptoms of the disease grew steadily worse, he could detect no material alteration in the condition of the patient. In like manner the few cases of atonic dyspepsia and chlorosis which he has treated by lavage, have, without exception, proved exceedingly rebellious, and only improved when subjected to the more ordinary course of medical treatment. Fenwick would, therefore, conclude that, although lavage is an invaluable remedy in certain cases of gastric disease, its indiscriminate employment in every case of disorder of digestion will prove a curse rather than a benefit, and will eventually throw discredit upon the whole method of treatment.

CIMICIFUGA IN THE TREATMENT OF DYSMENORRHŒA AND OVARIAN IRRITATION.

Following the example of Boddie, of Edinburgh, DR. JAMES BRUNTON has employed blacksnake-root in the treatment of dysmenorrhœa and ovarian irritation. He employed 30-minim doses of the tincture thrice a day, and was able to dissipate the occipital headaches and ovarian pains from which his patient suffered. In cases of dysmenorrhæa, similar doses every four hours produced great benefit.

Brunton believes that the drug is an anodyne, which is valuable as a substitute for the bromides and opiates in dysmenorrhagic pain.

When given for dysmenorrhœa, it should be given four days before, and continued over the period.

In metrorrhagia and menorrhagia, he believes it is a regulating agent, although it is sometimes disappointing in its action.—*Practitioner*, April, 1892.

[It will be remembered that Sir James Simpson employed the drug for similar purposes, and that it has been highly recommended in this country for the past fifty years for just these conditions by certain practitioners.—ED]

TREATMENT OF MYXŒDEMA BY INJECTIONS OF THE THYROID GLAND.

In the *British Medical Journal* for April 16, 1892, CARTER, of Whittingham, England, reports a case of a woman, aged 43, married, who was insane, and who was also suffering from well-marked myxœdema. She was injected with 25 minims of the extract of the thyroid gland of a cow, prepared according to the directions of Dr. Murray in his article in the *British Medical Journal* of October 10, 1891. Most of the injections were, however, made from the pig's thyroid. They were repeated twice a week for nearly four months. The mental symptoms improved, and rapid progress took place in improvement of the myxœdematous symptoms.

The following method is that employed by

Murray for the preparation of the thyroid for injection; this we include, thinking that some of our readers may not be familiar with it.

The gland having been cleared of fat and fibrous tissue, a portion, as large as a damson, was cut up, put into a mortar with some glass (for example, a broken test tube), about half a drachm of glycerin, and a drop or two of five per cent. carbolic acid solution, and the whole ground together to a fine paste. The latter was allowed to settle in a test-tube for twenty-four hours, leaving a clear dark-red extract at the top, which was decanted off, and filtered through linen to insure freedom from glass particles. The extract was made fresh every week, strict antiseptic precautions being observed with regard to all utensils, etc., used, which were cleansed by means of boiling or washing with carbolic lotion, and a drachm of it was given every week in divided doses.

In the present scanty state of our knowledge concerning the active principle of the thyroid gland and of the structural constituent from which it is derived, and in view of the variations not only in their size but also in the amount of fibrous stroma in the different specimens obtained, it seemed useless to pretend to any accurate dosage, and Carter's efforts were directed, as above described, to procuring the strongest extract that could conveniently be used for injection. The site of the latter was on alternate sides, between the shoulder-blades, and an ordinary hypodermic syringe was employed.

MYXŒDEMA TREATED BY THYROID-GLAND GRAFTING.

In the *Edinburgh Medical Journal* for May, 1892, MACPHERSON gives an account of his treatment of a case of myxœdema treated by means of grafting portions of the thyroid from the sheep. This treatment is closely allied to that which we have mentioned in previous numbers of the GAZETTE as employed by Murray and others, which consisted in injecting a solution obtained from thyroid glands of the lower animals.

Macpherson found almost instantaneous relief of some of the most pronounced symptoms after the grafting had been performed, and he believes that a considerable portion of the gland which he grafted was ultimately vascularized in the body of the patient. For this reason he believes his method to be better than that of injecting liquid.

The patient was 39 years of age, and three years before had first manifested symptoms of myxœdema. Her manner was listless and apathetic. She had to be forcibly fed. The speech was thick, prolonged, and deliberate, and motion and co-ordination were slow and clumsy. There were exaggerated tendon reflexes, well-marked supraclavicular swelling, filling up of the triangles of the neck, and enlargement of the tongue, which was flabby and indented with the marks of the teeth. The face was waxy in appearance and the cheek flushed. There was malnutrition of the skin and its appendages, and, although anæmia was present, there was also menorrhagia.

She was placed in bed for a week previous to the operation, and kept under the most favorable conditions. The right lobe of the sheep's thyroid was taken from a sheep, then being slaughtered at a near-by farm. The utmost antiseptic precautions possible were observed in removing the gland, which, after the removal, was washed in a warm, weak solution of perchloride of mercury. The gland which was removed was carefully protected in transit from the farm to the asylum in a warmed glass jar. In the mean time the patient was anæsthetized, and both inframammary regions were carefully washed and disinfected. The lobe of the thyroid was divided transversely into two equal parts, and each half was then split longitudinally. Two half curved incisions were made in the inframammary region of the patient, through skin and subcutaneous fat. A portion of the excessive fat was removed, and a piece of gland one and a half inches long was placed in each wound, in such a way that the surfaces of the split gland were in contact with the raw surfaces of the flaps of the wounds. The wounds were then closed and dressed in the usual manner. The wounds did not heal by first intention, and there was considerable suppuration afterwards.

Macpherson suggests some points in regard to the surgery of the operation, as follows:

1. That the method of slaughtering sheep usually employed makes it extremely difficult to remove the gland with ordinary cleanliness, to say nothing of absolute asepsis.

2. That bleeding the animal to death necessarily depletes the vessels of the gland itself to such an extent as to make it doubtful whether vascular connections can ever successfully take place in the human body.

3. On account of the redundancy of fatty tissue in the inframammary region, it cannot be regarded as a suitable part of the body for grafting tissue like the thyroid gland.

A more vascular, more muscular locality should be selected.

The results of the operation were as follows:

1. Within twelve hours there was such a marked mental improvement in the patient as to be noticeable by every person who came in contact with her. She became talkative, cheerful, answered questions readily, and the mental reflex, which was formerly so slow, became altered and quickened. Her intelligence and spontaneity markedly increased. Her speech, however, remained slow and drawling.

2. The average daily temperature for seven days after operation was 99 2°, and for nineteen days afterwards 98.9°.

3. The average daily quantity of urine passed for nineteen days subsequent to the operation was forty-one ounces.

4. The fear at night, the melancholia, and delusions disappeared on the day following the operation, and have not since recurred.

5. The vertical headache more or less persistent for three years has not since been felt.

6. The anæmic condition has been removed.

7. The skin is now soft and smooth, and the hair is not so dry.

8. The quantity of urine passed for the twenty-four hours ending on the 28th of February was fifty-two ounces.

9. Menstruation, which had for three years previously been irregular in the manner described, is now of monthly occurrence, and lasts only three days.

In conclusion, Macpherson does not claim that the operation has removed the myxœdematous condition, but it has relieved the symptoms, which, with the exception of the melancholia and stupor, have all been more or less constant for three years. Under favorable conditions, there is no reason why the relief should not continue. These favorable conditions are,—

1. Warmth, upon which Dr. Byrom Bramwell insists in his very able and lucid article on "Myxœdema" in his "Atlas of Clinical Medicine."

2. A farinaceous dietary, according to Mr. Victor Horsley's recent researches, as published in two papers in the *British Medical Journal* this year.

3. Avoidance of worry and overwork, which most authorities are agreed in recognizing as a causative agency.

4. Perhaps massage over the gland, which Professor Grainger Stewart and Dr. John Thomson have used with success in one case, might with advantage be practised.

Finally, Macpherson remarks, with reference to the sudden mental and physical change following the operation, that he entirely agrees with Dr. Murray and Mr. Fenwick in the opinion expressed by them in the *British Medical Journal* of the 10th of October, 1891, that the sudden change could not be due to the engrafted thyroid gland becoming functional, but to the absorption into the system of its special secretion.

HOW COCAINE PRODUCES DEATH.

MAUREL (*Bull. Gén. de Thérap.*, March 15, 1892) has published an interesting experimental study of the action of cocaine upon the blood of man and that of the rabbit. Among the many conclusions arrived at by the author, the following may be mentioned: 1. Death by cocaine appears to result from the destruction of the leucocytes, or from the changes produced in them through the influence of the drug. 2. Death appears to take place in two manners,—by *saturation of the blood* or by *embolism*,—according as the cocaine comes in contact with the blood in *non-toxic* or *toxic* quantities for the leucocytes. 3. In the rabbit, 1 centigramme of chlorhydrate of cocaine is sufficient to kill the leucocytes in one gramme of blood, and 1 centigramme of the salt per kilogramme of the body-weight, injected into the femoral vein of the animal, is likewise sufficient to produce death in less than five minutes. 4. Hypodermically administered, or by the stomach, the lethal dose is three times as large. 5. In man, the leucocytes in one gramme of blood die under a dose of from 1 to 1½ milligrammes; the same effect is produced in sixty grammes of blood, which is the tenth part of the whole amount in a man weighing sixty kilogrammes, by a dose of from 6 to 9 centigrammes of the salt. 6. In the rabbit, the rapidly toxic solutions for the leucocytes are in the proportion of from 75 centigrammes to 1 gramme per 100. 7. In man, the rapidly toxic solutions for the leucocytes range from 10 to 20 centigrammes per 100 of blood, the average being 15 centigrammes. 8. The possibility, on the one hand, of killing a rabbit by an injection of cocaine sufficiently large to destroy the leucocytes in one-tenth of the animal's total amount of blood, and, on the other, the possibility of injecting the same proportionate

amount of drug, in the case of man, may give rise to the assumption that such quantities produce the poisonous effects observed by being introduced directly into the blood. 9. In death by *saturation*, in the case of the rabbit, as well as that of man, the great tendency of the leucocytes is to assume the spherical form. 10. In death produced by intravenous injections, the fatal issue is caused through the rapid death of the leucocytes, which, assuming the form of rigid disks, act as *emboli*. 11. As stated before, death by cocaine is effected through two mechanisms,—*saturation of the blood* and *embolism*. 12. From the results of the experiments upon the rabbit, the solutions of the strength of 10 centigrammes of the chlorhydrate of cocaine per 100 grammes of distilled water are seven to eight times inferior to those which are lethal to the leucocytes; but they are sufficient to produce, injected into the cellular tissue, an anæsthetic effect, lasting about fifteen minutes. 13. In all cases, for hypodermic use, solutions higher than 15 centigrammes of chlorhydrate of cocaine per 100 grammes of distilled water, should not be employed. Feeble solutions are free from danger; those composed of 5 centigrammes per 100 grammes of water may be employed in relatively large quantities without producing untoward effects.

The practical inference drawn by the author from this research is, that the danger of hypodermic injections of the chlorhydrate of cocaine, lies from the start in the concentration of the solution employed, and not in the quantity of the drug administered; and afterwards, in the accidental penetration of the toxic solutions into the blood-vessels.

THE ACTION OF NAPHTHOL AS AN ANTISEPTIC.

A series of experiments has been instituted by STACKLER and DUBIEF (*Bull. Gén. de Thérap.*, March 30, 1892) regarding the antiseptic powers of pure naphthol. The authors prepared a *cold* solution, of the strength of 5 per 100, and one at the temperature of 36° C. This solution was then applied, in the proportions of 1, 2, and 3 cubic centimetres respectively, to cultures containing the following microbes: Asiatic cholera, typhoid fever, bacillus pyocyaneus, staphylococcus aureus, carbuncle bacterium, herpes tonsurans, and the penicilium glaucum. Under the action of 1 cubic centimetre of the *cold* solution, the cultures were unaffected; under that of 2 cubic centimetres, the cultures of Asiatic cholera, typhoid fever, and herpes tonsurans were retarded; under the action of 3 cubic centimetres, the cultures of typhoid fever, staphylococcus aureus, bacillus of carbuncle, and the bacillus pyocyaneus were retarded, while those of Asiatic cholera and herpes tonsurans were *arrested*. With the solution at 36° C. the results were more decided; 1 cubic centimetre of this was sufficient to retard all the cultures, except that of the bacillus pyocyaneus; 2 cubic centimetres produced an arrest of *all* the cultures.

THE SUBCUTANEOUS INJECTIONS OF OILS.

TOUVENAINT, in the *Bulletin Générale de Thérapeutique* for February 15, 1892, contributes a paper from the laboratory of therapeutics in the hospital Cochin, in which he states that, his attention having been called to the practice of Bouchard and Gimbert, of administering creosote subcutaneously in pulmonary phthisis, it occurred to him that, as their vehicle was sterilized olive oil, some of the improvement might be due to this substance. Gimbert, when explaining this method, asserted that the oil was completely absorbed from the cellular tissues. Burlureaux has not employed this vehicle for creosote, but has used liquid vaseline instead. It has already been decided by Dujardin-Beaumetz that absorption of oil, when introduced into the cellular tissues, is perfectly possible, and that nutrition can be carried on by this means.

Daremberg, in 1888, in a series of experiments, concluded that the subcutaneous injection of oil had bad results upon rabbits and guinea-pigs. It has been found, however, that the rapidity of absorption of the oil is dependent upon the manner in which it is introduced under the skin and the rapidity of its introduction.

In the first rabbit, Touvenaint employed an injection of 7 drachms of oil, colored with carmine, and immediately afterwards made an incision over the spot which had been penetrated. The oil was found to have thoroughly infiltrated the tissues into which it had been injected, and the coloring-matter was firmly fixed in them. While in the lymphatic circulation and blood, there was not a trace of the oil or of its coloring-matter.

The second rabbit received 3½ drachms of oil, which was not colored. Half an hour afterwards a vein in the ear was opened, and, after the addition of osmic acid, was examined with a microscope. Two hours afterwards the withdrawal of some of the liquid with a pipette from the site of incision showed, first, isolated

drops of oil mixed with red globules, and in a number of cases particles of oil seemed to be attached to a number of red blood-corpuscles.

A third rabbit received 2½ drachms of oil in the cellular tissue of the back. Fifteen hours afterwards the oil was recovered at the point of injection. Following these experiments, two rabbits were taken, both of the same age,—namely, three months,—and each received a minimum of food by the mouth. One of these rabbits received a dose of oil varying from 7 to 10 drachms. The other received no oil. The first died on the seventh day. The weight of the animal which received the oil on the first day was 1242 grammes, and on the day of its death 1206 grammes. The rabbit which received no injection was on the day of the experiment 1275 grammes, and seven days later 1270 grammes. The animal which received the oil rapidly lost its appetite, and after the fourth day refused to eat. The temperature-curve during these days is of interest, as there was a distinct fall, amounting to from two to five degrees each day. The urine also contained albumin. At the autopsy a longitudinal incision was made over the belly, which showed a quantity of oil, and the tissues were found distended. The peritoneum was fatty, and this fattiness was marked in the region of the spleen. There was no abnormity of the liver or kidneys.

Another rabbit received 3 drachms of sterilized olive oil, and was killed at the end of twenty days. There was a gain in weight of this animal from 1307 grammes to 1674 grammes. The diet in this case was not, however, limited, and there was not the fall of temperature, nor did the urine contain albumin. The autopsy revealed the same alterations. The mesentery was fatty. There were large deposits of fat upon the anterior surface of the liver and pylorus.

In another series of experiments, ½ drachm of the oil was given to rabbits and guinea-pigs, with an increase in weight in the case of the guinea-pigs, which, of course, received the larger dose proportional to their weight.

Among the other oils which Touvenaint employed may be mentioned cod-liver oil. A guinea-pig, which received for two days 15 minims of cod-liver oil, died on the ninth day. The rabbit rapidly emaciated.

Finally, in the case of dogs receiving 4 drachms of the oil, there was no increase in weight. These experiments would, therefore, seem to prove that small doses of oil, given hypodermically, may be absorbed with some advantage, but that large doses are capable of producing a fatal result, and are distinctly harmful.

INFLUENCE OF THE OPIUM ALKALOIDS UPON THE PERISTALTIC MOVEMENT OF THE INTESTINE.

Dr. G. Leubuscher (*Deutsche Med. Wochenschrift*, March 3, 1892) calls attention to the use of opium and its alkaloids. He holds that the solution of the question as to the greater action of opium than of morphine, for instance, upon the digestive tract, lies in the fact that opium holds besides morphine still other alkaloids which influence the intestinal movement more intensely.

Authors differ so in their estimate of the relative strength of the various alkaloids of opium that it is only possible to conclude that some of them must have experimented with impure drugs. Leubuscher himself made most careful experiments with the opium alkaloids —first testing the purity of the drugs—upon rabbits. The results show that morphine acts most powerfully upon the peristaltic movement of the intestine. Next comes papaverine, which is not so certain and prompt as the former, but strong enough. Narcotine had a decidedly weaker action, larger doses being necessary to produce any result. Narceine and codeine were both equally inactive. Thebaine, finally, showed itself directly exciting. So we have morphine, papaverine, narcotine, which possess a quieting action on the intestinal movements; codeine and narceine, which are entirely without influence; and thebaine, which increases the irritation of the intestine. Leubuscher then wished to ascertain whether these facts really held true in men also,—whether papaverine would produce a delay or constipation when given to persons who had a perfectly regular and normal habit. To a number of such persons, inmates of an insane asylum, he administered papaverine muriate in doses of from ⅙ grain, gradually increased to 4½ grains. The dose was given subcutaneously or in powders. The result was not invariable. Some individuals, chiefly the younger ones, soon had a temporary constipation, while upon others even the largest doses had no apparent effect. The results were the same when given either way.

Then the drug was given to a number of adults who were suffering from diarrhœa; here also the results were entirely unsatisfactory. One woman, who had suffered for weeks from a persistent diarrhœa, possibly from tuberculosis of the intestine, had relief as long as the papaverine was given three times a

day, in doses of ⅓ grain, and was speedily ill again when it was interrupted. In the majority of cases the result was at least not marked. One point he calls special attention to. In no case, even from the largest doses, was there the least bad result from the drug. Not once was there even a trace of stupor or sleepiness, or any effect on the circulation, respiration, or appetite. This led him to try it for diarrhœa in children. Though opium and its like are not commonly given children, he felt there was no contraindication here, and gave it to children from 12 days to 5 years old with no bad results. A large number were 3, 4, and 5 months old. The result was much better than in adults, the action upon the intestine being stronger. The doses ranged according to the age, from $\frac{1}{12}$ to $\frac{1}{8}$ grain. No doubt still larger doses could safely be administered, but they were not necessary. Usually three to four doses of ⅜ grain daily sufficed for children 2 years old to cure a diarrhœa which had persisted some days. In many cases six or eight doses were necessary, probably because the first ones were, out of caution, too small. The powder was always used with milk-sugar. The little patients were, in part, in his private practice, in the children's ward of the surgical clinic, and in part also in the medical polyclinic. These results give him reason to commend the absolute safety of papaverine in the treatment of children.

TREATMENT OF BASEDOW'S DISEASE, OR EXOPHTHALMIC GOITRE.

In the *Revue de Thérapeutique Générale et Thérmale* for April 5, 1892, the following treatment for this condition is given:

As is well known, the disease is characterized by three chief symptoms,—cardiac palpitation, exophthalmia, and enlargement of the thyroid body. There is also apt to be trembling of the upper extremities, which is a valuable diagnostic sign. The treatment of the disease in its two phases is as follows:

1. At the moment of the paroxysm when there is marked dyspnœa and tachycardia, and (2) during the general course of the malady.

If the difficulty of breathing is exceedingly severe, and death seems imminent from the interference with respiration, tracheotomy is necessary, but is not otherwise to be performed, since it is exceedingly difficult to do the operation, owing to the dilatation of the vessels of the neck, and fatal hemorrhage may ensue upon injury to one of these vessels. For the purpose of combating the cardiac excitation, which is the principal factor of the paroxysm, the method originally proposed by Trousseau, is to be carried out. Full doses of digitalis-leaves, from ½ to 1 grain, should be given every half-hour for two or three hours, as long as the intensity of the paroxysm lasts. Ice should be applied over the præcordial region in an ice-bag or in a bladder. If, after three hours, there has not been evident great amelioration of the symptoms, recourse may be had to bleeding. Most of the other symptoms have to be treated upon general principles. The treatment which is to be employed during the course of the disease, at other times than those at which the paroxysm is present, differs largely with each authority. Probably the iodides and iodine have been most frequently recommended.

Cheadle, of London, is an ardent supporter of tincture of iodine internally, and there is little doubt but that this treatment is efficacious in simple goitre.

The anæmia which frequently accompanies exophthalmic goitre must be met by the administration of ferruginous preparations, and it may be necessary, in order to quiet excitation of the nervous system and the cardio-vascular system, to use bromides in full doses or, in other cases, to employ valerian in the form of the extract, which does much towards quieting the nervous system, the palpitation, and the dyspnœa. All authors are in accord as to the value of digitalis in this affection, probably owing to the favorable influence which it exerts upon the heart through its influence on the pneumogastric. It is particularly useful for the violent tachycardia. Much smaller doses suffice under these circumstances than those which are administered during the paroxysm.

Belladonna is useful in some cases, and Grasset has highly recommended the neutral sulphate of atropine, in order to avoid the severe suffering which is sometimes present.

Sée recommends very highly, for the purpose of quieting the pulse, tincture of veratrum viride, in the dose of 10, 12, or 20 drops a day.

Hydrotherapy, for the purpose of improving the general systemic condition, is highly valuable.

The question as to the usefulness of electricity in exophthalmic goitre is unsettled. In some cases it seems to be of value, and in others it is useless. Three to eight milliam-

pères is a sufficiently strong current when used from eight to ten minutes.

The *séances* should be extended for at least a month, and after this treatment should be suspended for about eight days. One pole of the battery should be applied over the superior cervical sympathetic. Other physicians, however, apply faradism over the anterior surface of the chest, particularly in the præcordial region, one pole being placed over the first cervical vertebra. The positive pole should be placed over the heart.

In a case of exophthalmic goitre, Dieulafoy gave the following prescription, as there was a distinct tendency to hæmoptysis :

℞ Powdered ipecac, gr. ½;
Powdered digitalis-leaves, gr. ¼;
Extract of opium, gr. $\frac{1}{10}$. M.

Sig.—To be made into one pill. From four to six of these pills may be given in twenty-four hours.

The effect of this medication is a decided moderation in the symptoms and general improvement in the condition of the patient. Should diarrhœa follow the administration of ipecac in these constant doses it may be guarded by increased doses of opium.

THE USE OF SOLANINE IN GASTRIC DISORDERS.

Desnos believes that solanine gives important results in the treatment of painful diseases of the stomach, which are equal or superior to those obtained from cocaine, chloroform-water, or the bromides of strontium or of calcium.

The price of solanine is practically the only objection to its employment, but he believes, if its use is more general, that this cost will be very much reduced. He has used the drug in a large number of cases, such as gastralgia, dyspepsia with painful manifestations ; alcoholic gastritis, with and without dilatation of the stomach. In a case of gastric ulcer with hematemesis, and in one with cancer of the pylorus with vomiting, great relief was rapidly obtained through the use of solanine.

Desnos prescribes solanine in the form of a pill, as hypodermic injections are too painful. The dose which he administers is ¾ grain.

It will be remembered that solanine is the poisonous principle derived from the sprouts of the ordinary potato. He gives ¾ grain half an hour before a meal, if the dyspepsia is exceedingly severe. In any case it is an advantage to prescribe the solanine in a mucilage. The maximum dose to be employed in one day should not exceed two grains.—*Journal de Médecine de Paris.*

INCOMPATIBLES OF ANTIPYRIN.

The *Pharmaceutische Centraiblatt*, No. 29, 1892, gives the following incompatibles of antipyrin, which precipitate the antipyrin from a concentrated solution.

1. Concentrated solutions of carbolic acid.
2. Tannic acid and preparations containing it.
3. Tincture of iodine.
4. The chlorides of mercury.

The following substances also decompose antipyrin when triturated with it :

1. Calomel forms with antipyrin a toxic combination.
2. Antipyrin is decomposed when rubbed with beta-naphthol.
3. With chloral, antipyrin forms an oleaginous liquid.
4. With bicarbonate of sodium, it disengages the odor of ether.
5. Salicylate of sodium, equal parts with antipyrin, forms an oleaginous mixture.

PHENATE OF COCAINE.

Phenate of cocaine is a popular remedy with some European physicians in the place of the hydrochlorate of cocaine, being used in this form for applications to the pharynx and tonsils. The *Journal de Médecine de Paris* for April 3, 1892, gives the following formula for its use :

℞ Phenate of cocaine, gr. xv;
Absolute alcohol, ʒiiss.

Or,

℞ Phenate of cocaine, gr. xv;
Spirits of ether, ʒiiss.

For hypodermic injections, or for dropping in the ear in cases of otalgia, the following may be employed :

℞ Phenate of cocaine, gr. iss.

Sig.—Dissolve in 1½ drachms of alcohol, and add equal quantity of distilled water. Of this from 10 to 30 minims may be used at a time.

For atomization for inhalations in affections of the larynx and bronchial tubes, phenate of cocaine may be used as follows :

℞ Phenate of cocaine, gr. iss;
Menthol, gr. iv;
Dilute alcohol, ʒiiss.

One-fifth part of this solution may be employed in an atomizer during the day.

As a powder for the treatment of acute or chronic nasal catarrh :

℞ Phenate of cocaine, gr. iii;
Powdered boric acid, gr. xxx.

Or,

℞ Phenate of cocaine, gr. iii;
Acetanilide, gr. xxx.

Or,

℞ Phenate of cocaine,
Menthol, āā gr. iii.
Powdered convallaria flowers,
Subnitrate of bismuth, āā gr. xxx.

Finally, the following may be employed for this purpose :

℞ Powdered tormentilla root,
Powdered coffee, āā ʒiss.

For insufflation into the larynx the same journal also recommends phenate of cocaine, 1½ grains, and antipyrin, 45 grains.

For gastric pain, the following may be given :

℞ Phenate of cocaine, gr. ¾;
Acetanilide, gr. xv. M.

Sig.—Divide into ten powders, and take one or two powders in the morning in cases of acute catarrh of the stomach or the vomiting of pregnancy.

The following may also be used :

℞ Phenate of cocaine, gr. ¾;
Subnitrate of bismuth, gr. xxx. M.

Sig.—Make into five powders. Take one powder each morning, or, in the case of gastralgia, one hour before the time for the habitual attack of pain.

Or,

℞ Phenate of cocaine, gr. i;
Powdered condurango, gr. xv. M.

Sig.—Make into ten powders, and take a powder in the morning early in case of cancer of the pylorus.

ANÆSTHESIA PRODUCED BY BROMIDE OF ETHYL.

Dr. Gilles (*Berliner Klin. Wochenschrift*, February 22 and 29, 1892), having made use of bromide of ethyl in more than fifteen hundred cases since 1887, reaches the conclusion that it is a valuable agent, which should be known to all physicians; it being as important, he says, to the family physician as to the surgical specialist, because in the ever-recurring minor operations it is the best anæsthetic.

It is claimed that bromide of ethyl was first prepared in 1827 by Serulas, and first recommended for general use as an anæsthetic by Nunnely, an American, in 1849, or three years after the introduction of ether and two years after the first use of chloroform.

Nunnely, however, did not succeed in attracting the attention of many physicians to the new drug, in spite of the fact that he made a series of successful experiments upon men and animals, giving it the preference over chloroform.

Not until many years later, in 1876, did the Frenchman Rabuteau succeed in awakening a greater interest in bromide of ethyl in France and America. His experiments on animals showed that it produced anæsthesia more quickly than chloroform, without causing stronger signs of excitement, and that it was quickly and entirely expelled from the lungs. Rabuteau tried it on himself, feeling a slight tinnitus aurium after a few breaths, and after two minutes of inhalation a slower pulse and extraordinary lessening of the respiration.

In 1879 bromide of ethyl was further commended by Turnbull and Levis in America, and in 1880 in France by Terrillon. Turnbull used it with great success in eye and ear operations, and Levis in severe operations, while Terrillon not only praised it as a general anæsthetic, but as a local anæsthetic. All three authors claimed as the special advantages of the drug the remarkably rapid appearance of anæsthesia; the very rare occurrence of nausea and vomiting; the slightness of its effect on the circulation, together with the extremely rare onset of a period of excitation, and the very rapid and complete recovery from the narcosis. In 1883, Chisholm, in a brief treatise, entitled "Bromide of Ethyl, the most Perfect Anæsthetic for Short, Painful Surgical Operations," tells of four hundred cases in which he used it with admirable results.

In spite of all these praises, much was said against the drug, some claiming that it did not anæsthetize sufficiently, while Wood, of Philadelphia, in 1880, claimed that his experiments showed that bromide of ethyl was like chloroform, dangerous on account of its action on the heart-muscle.

There is now no doubt that the reported failures were due, on the one hand, to faulty use of it, and, on the other, to the use of impure preparations, and also to a confusion of the dangerous bromide of ethylene with it, on account of the similarity of names.

Since the year 1887 anæsthesia with bromide of ethyl seems to have entered upon a new era. Dr. Asch, who wrote of it in the

Therapeutische Monatshefte in February of that year, and the doctor's dissertation of Julius Scheps, which appeared at about the same time, appear to have opened the door for it.

It was soon evident that to use it successfully there must first be a chemically pure drug; and, second, that it should be handled in accordance with its peculiar properties, which demand a quite different technique from chloroform. We now have perfectly pure preparations, and know in what manner to apply the drug to produce anæsthesia.

Bromide of ethyl is a colorless fluid, of neutral reaction, having a slight, pleasant odor resembling that of chloroform, but less persistent, and a specific gravity of 1.390, with boiling-point 102¼°. It evaporates very rapidly, so that the mask is often covered with small ice crystals. A few drops poured in the hand evaporate in a few moments, leaving no fatty feeling. This rapid evaporation is such a marked characteristic that any preparation not possessing it should not be made use of. Likewise a bromide of ethyl having an unpleasant odor, or giving an acid reaction when shaken up in water, is worthless.

Bromide of ethyl is not soluble in water, but combines with alcohol and ether. It does not explode upon contact with a flame, but burns readily with a greenish flame. If anæsthesia is undertaken by lamplight, the bromide-of-ethyl fumes decompose, forming bromal hydrate and bromine, causing, if used some time, a strong odor in the room. Sunlight also has a decomposing action, so that the bromide of ethyl should be kept in dark bottles. That it decomposes upon contact with the air, at least as far as its anæsthetic action is concerned, Dr. Gilles has not been able to confirm. Upon making more frequent use of it, he began to procure it in flasks containing from eight to eleven ounces, and has found the last of it used as effective as the first.

Bromide of ethyl is now prepared universally from the French prescription by the distillation of a mixture of sulphuric acid and alcohol, to which powdered bromide of potassium is gradually added.

Anæsthesia occurs, if it is rightly administered, much more rapidly from bromide of ethyl than from chloroform, often with marvellous rapidity; in general, it may be said to occur in from one-quarter to one and a half minutes, only exceptionally requiring two minutes or more. Such would nearly always be accounted for by very nervous, excited persons or unskilful administering.

A very small quantity is needed to produce anæsthesia. Gilles finds the amount necessary, varying with the age and constitution of the patient, from 45 minims to 3¾ drachms.

In use it differs from ether and chloroform, in that it is not used a drop at a time, but about a teaspoonful is applied at once to a thick flannel or like material, which should be held so as completely to cover mouth and nose. If these rules are not followed, no sufficient anæsthesia can be produced by bromide of ethyl.

The larger quantity is necessary on account of its volatility, and experience has proved that it only possesses sufficient anæsthetic properties when the least possible amount of atmospheric air is breathed along with it.

Dr. Gilles has invented a mask which is very convenient to use, and fills all the requisites for the proper application of the bromide of ethyl. In almost every case the patient appears during anæsthesia as though sleeping naturally, often snoring slightly. The duration of anæsthesia is usually from one and a half to three minutes; it is not advisable to prolong it by giving added quantities; it is always better to let the patient recover fully, and then administer it a second time after a short rest.

During the past three years about twenty thousand anæsthesias have been produced by this drug in Germany, and not one case of resulting death from it can be proved following the use of a chemically pure preparation. The advantages and disadvantages resulting from the use of bromide of ethyl may be briefly counted thus:

1. Extreme simplicity and convenience of its application.
2. The safety of anæsthesia produced by small quantities of the drug.
3. The very rapid occurrence of anæsthesia, and very rapid awakening from it.
4. In the great majority of cases the almost absolute comfort (good health) upon the return of consciousness.
5. The rare occurrence of vomiting.
6. The fact that a second physician is not necessary.

But, on the other hand,—

1. Its uselessness for long operations.
2. The occasional occurrence of great excitation.
3. The bad odor remaining in the patient's mouth for two or three days.

TREATMENT OF ASTHMA.

According to *L'Union Médicale* for April 26, 1892, DIEULAFOY recommends the following treatment for asthma: As soon as the attack commences, the physician is to apply to the nasal fossa, as far back as possible, a piece of cotton wet with a solution of cocaine, in the strength of 1 to 20, or the solution may be dropped into the nose. If this does not succeed, the patient is to respire freely from 6 to 12 drops of pyridine from a handkerchief; and, if this does not bring relief, a hypodermic injection of ⅙ to ¼ grain of morphine is to be given. If thought wise in other cases, smaller doses may be given, and repeated every quarter-hour until relief is obtained. For the relief of the tendency to asthma, the three medicaments are iodide of potassium, belladonna, and arsenic. In cases of emphysema, recourse is had with success to baths of compressed air.

THE VALUE OF RESORCIN IN GASTRIC ULCERS.

In the *Provincial Medical Journal* for May 2, 1892, POPE, of Leicester, records the results which he has obtained in the treatment of gastric ulcer by means of resorcin, referring to a paper by Dr. Mackey, of Brighton, which was published in the *Lancet*, vol. i. p. 570, who treated fifteen cases by this method, using 5 grains three times a day. In Mackey's cases it proved very valuable in fourteen. Its employment is based upon the fact that it is antiseptic, analgesic, and hæmostatic.

Pope believes that its analgesic property is the most valuable, as by this means the stomach is able to tolerate food, when otherwise it would be excessively sensitive, ulcerated, or eroded. The antiseptic effect which it produces is valuable in the prevention of fermentation.

The ordinary dose is 5 grains three times a day. Pope also states that he has found resorcin of value in gastric cancer. Under its use he has seen foul tongues become clean, and stomachs which formerly rejected almost all food become tolerant. Under these circumstances, however, it is a drug which modifies the symptoms rather than the disease itself.

CONCERNING THE INDICATIONS FOR OPERATION FOR FOREIGN BODIES IN THE CRYSTALLINE LENS.

TERSON (*Archives d'Ophthalmologie*, March, 1892) comes to the following conclusions: 1. The presence of a foreign body, of small dimensions, in the crystalline lens does not always demand an immediate operation, but it requires close watching because serious accidents may unexpectedly arise. 2. An immediate operation is required when the foreign body is voluminous, or when its position causes the fear of a possible displacement, which would be still more dangerous; or as soon as the least sign of infection appears. 3. There is an opportunity for operation, although no absolute necessity, when the opacity of the lens is sufficient to make it likely that the exact position occupied by the foreign body will disappear from view. 4. The operation should consist in a large incision of the cornea with iridectomy, the object being to extract the whole crystalline lens with the foreign body contained within it. 5. The site of the incision should be such that its centre corresponds with that point of the corneal circumference which is nearest to the body contained in the crystalline lens. 6. Sometimes it is proper to attempt to remove the crystalline lens in its capsule. 7. It is seldom safe to delay the operation indefinitely, because in the complete softening of the lens the foreign body may detach itself from it, and disappear during the operative manœuvres, with the risk of becoming later the starting-point of serious accidents. 8. Cases are sometimes encountered in which, with a foreign body being in all probability left in the eye after having injured the crystalline lens, it is possible to extract the swollen lens without subsequent accidents, but this practice would be improper if there was the least sign of infection of the eye. 9. The use of the magnet, or of the electro magnet, is advised only when the foreign body (bit of steel) is lodged in the superficial layers of the crystalline lens.

PRELIMINARY AND AFTER-TREATMENT IN CATARACT OPERATIONS.

DR. L. WEBSTER FOX (*Annals of Ophthalmology and Otology*, April, 1892) urges a careful inquiry into the patient's general condition before making the operation of cataract, and especially a search for gout, rheumatism, or syphilis, and advises a strict diet and the use of natural waters. One week previous to the operation the eye should be bathed twice daily with hot water, followed by a boric acid lotion, and the night before the operation an ointment of hydrargyrum applied over the brow of the selected eye. As internal

remedies, bichloride of mercury and potassium iodide are advocated. Just before the operation the eyeball is thoroughly cleansed with the aid of a hydrostatic eye-douche. After puncture and counter-puncture are made, Dr. Fox advises that the knife be withdrawn with one sweep, so that the blade will pass through the tissues without causing a jagged edge, which is almost inevitable with any sawing movement. Cortical *débris* is washed out of the anterior chamber by placing the point of a bulbar-shaped syringe against the lips of the wound and gradually forcing an aseptic stream into the chamber. If iridectomy has been performed, a solution of atropine is dropped into the eye, in the simple extraction, eserine. As a dressing eye-pads are employed, which are held in place either by adhesive strips or a knitted bandage. The pad is composed first of a lining of antiseptic gauze, then a layer of cotton, next a linen sheeting, and lastly the white gauze for the external covering. Larger pads are also employed; one with white and the other with black linen sheeting. The size of the pads is six and a half by three and a half inches, all being hydronaphtholated. The eye is allowed to rest for twenty-four hours, when the pads are replaced by fresh ones. If on the third day a slight conjunctivitis develops, it is advised to dispense with bandages for at least two hours daily, merely protecting the eyes from excessive light by smoked glasses. If necessary the eye of the patient may be protected by a thick wire netting, the one after the Vienna model being preferred. At the end of five days all bandages may be dispensed with; in some cases even as early as the third day. As a rule, distance glasses are given at the end of four weeks; those for reading or near work two weeks later.

IDIOPATHIC VITREOUS HEMORRHAGE.

Dr. James A. Spalding (*Archives of Ophthalmology*, April, 1892) records six cases of idiopathic vitreous hemorrhage, and summarizes the treatment as follows: Hypodermic use of pilocarpine given in $\frac{1}{12}$ grain doses once a day for two weeks, the dose to be regulated according to the effect. In case no distinct effect is produced, the dose may be raised to $\frac{1}{8}$ of a grain. It is not necessary, according to Dr. Spalding, to produce visible physiological effects for the remedy to be useful in the eye. In some cases mercurials are indicated, either in the form of inunction or occasionally by the hypodermic method with corrosive sublimate. The constant current is referred to, and he has had favorable results by using an ordinary faradic battery to each eye twice daily for five minutes. Heurtloup's artificial leech is indispensable in the beginning of the attack.

TREATMENT OF TRACHOMA.

W. F. Strangways (*Ophthalmic Record*, April, 1892) doubts the value of excision of the retrotarsal folds, thorough scarification of the conjunctiva, and then scrubbing it with a solution of bichloride of mercury, and other violent forms of operative procedure which have been advocated in the management of chronic trachoma. He strongly advocates the method, originally devised by Dr. Hotz, of crushing the follicles between the thumb-nails. It is very important that there should be proper exposure of the surface, and for this purpose it is advised that the lid should be everted in the usual way; then the everted lid should be drawn upward with one thumb, while the other exercises firm backward pressure on the eye through the lower lid. The patient should be directed to look downward. As the eye is pressed backward the fold everts.

RELAPSES IN GRANULAR INFLAMMATION OF THE CONJUNCTIVA.

Galezowski (*Soc. de Chir.*, February, 1892) has been struck with the extreme frequency of relapses in granular disease of the conjunctiva, and believes that the cause resides in lesions of the lachrymal ducts which complicate the granular conjunctivitis. These lesions, which exist ninety times in one hundred, are either obstructions or contractions of the lachrymal ducts. If the latter are not treated, the reproduction of the granulations of the conjunctiva is rapid.

MASSAGE IN CLEARING THE CORNEA OF TRAUMATIC OPACITIES.

Dr. William H. Baldinger (*Ophthalmic Record*, April, 1892) reports the case of a woman, aged 60, who accidentally instilled into her eye a saturated solution of nitrate of mercury. There were aggravated inflammation of the conjunctiva and corneal opacity as the result. As soon as all active symptoms of inflammation had subsided, gentle massage of the cornea was undertaken with the aid of a one per cent. salve of the yellow oxide of

mercury. When the treatment was begun, the vision was equal to seeing shadows, and on the thirty-fifth day of treatment had risen to $\frac{20}{LXX}$. The reporter urges the use of gentle massage to hasten the clearing of the cornea of opacities due to traumatism.

THE DIRECT APPLICATION OF HOT WATER IN CERTAIN CORNEAL AFFECTIONS.

J. A. LIPPINCOTT, of Pittsburg (*Ophthalmic Review*, March, 1892), recommends the repeated instillation of water at a temperature of about 150° F., applied directly, drop by drop, to the affected area in obstinate corneal ulcers and in suppuration after corneal wounds. He details one case in which this method was very effectual, and refers to others in which he has been satisfied with its results. He advises that the water be heated in a test-tube, or some other vessel, in order to secure a certain temperature, and then transferred by means of a dropper and applied as before described.

AN IRIS-SHIELD—A NEW CATARACT INSTRUMENT.

DR. CHARLES W. DODD (*Archives of Ophthalmology*, April, 1892), in order to obviate the danger of injuring the iris in extraction by the simple method during capsulotomy, whether performed by means of the Graefe cystotome or the toothed forceps, recommends an iris-shield. This is constructed as follows: It is simply a small, thin plate of silver, fastened edgewise to a flexible silver shank, the flexibility of the latter allowing the shield-plate to be placed at will at the most convenient angle with the handle. It is applicable to either eye, and for use in right or left hand; when the forceps are used in the right hand, the shield is, of course, held in the left, or *vice versa*.

The shield-plate is introduced into the corneal wound, and covers the adjacent section of the iris, its inner edge extending just to the margin of the pupil. The tip of the forceps, or the cystotome, is introduced lying upon the upper surface of the shield, and thus is prevented from contact with the iris; slight pressure upon the iris produces a free space between the shield and inner surface of the cornea, and thus abrasion of the latter is easily avoided. The shield-plate must be perfectly smooth, and only so thick as to give it the necessary strength.

RIPENING OF IMMATURE CATARACTS.

BOERNE BETTMAN (*Chicago Medical Recorder*, April, 1892) advocates the following method: After doing an iridectomy, the eye is rotated downward with a fixation forceps, so as to facilitate the entrance of the spatula into the anterior chamber, and to permit its free movement in all directions. The instrument employed is such as is commonly used in restoring a prolapsed iris. It is flat, twenty-five millimetres long and one millimetre broad, a slightly flexible piece of steel attached to a handle. The blunt surface or the spatula is placed in contact with the lens, and gentle but firm to-and-fro motions are made over its surface. The ends are slid under the iris on both sides of the pupil and below it, the massage being thus continued over the larger portion of the lens. A half dozen to ten strokes will suffice. The spatula is carefully removed, the eyes sprayed with a sublimate wash, or more often with a boric acid solution, two drops of atropine are instilled, and the eye is bandaged.

CEREBRAL ABSCESS, AFTER OTITIS MEDIA ACUTA, HEALED BY OPERATION.

A case of this character, in which temporal pain, vertigo, aphasia, and slight paresis of the opposite facial and arm were the localizing signs, is reported by TRUCKENBROD, of Hamburg, in the *Archives of Otology* for April. Although there were no signs of mastoid inflammation, this part was freely opened with the chisel by Schide, who was called in, and some cheesy osteitis revealed, and the operation was carried through the unaltered roof of the antrum. The dura was divided without finding pus, and the tense brain explored with the hypodermic needle. Pus and clear fluid to the amount of sixty grammes were evacuated from a cavity up and forward. The opening was enlarged with the knife, irrigated, a tube inserted, and the abscess and wound treated with sublimate and iodoform. A larger tube had to be inserted, because clogging caused renewed trouble; otherwise the result was ideal and the healing perfect, except in the early occurrence of exhaustion at mental work. Reviewing the results in similar cases, from his former case with Schide, which heads the list, Truckenbrod cites seventeen successful cases and two of his own in which the termination was fatal. The operation of opening up the mastoid in all these cases is dwelt upon as generally necessary in itself, and not infrequently fur-

nishing indications for the further operative steps, under the guidance of fistulous tracks; and the evacuation of the brain abscess through the mastoid opening may, as in this case, be an ideal operation. The papers of Hessler and Hecke, on "Extra-Dural Suppuration," read at the same meeting of German naturalists, pointed strongly in the same direction; the former, among a hundred mastoid trephinings, having found the dura exposed by the caries in seventeen cases (with pus beneath it in four), of which fourteen recovered. The literature showed fifty instances of extra-dural abscess, with fourteen recoveries after operation. The mastoid operation should, therefore, be a thorough exploration as well as a measure for the removal, if at all possible, of the pathological condition, rather than a mere means of drainage.

CARE AND PRESERVATION OF EYE-SIGHT.

Dr. L. Webster Fox, in a lecture published in the *Journal of the Franklin Institute*, June, 1892, discusses eyesight in middle life and old age, and gives certain hints for its care and preservation, from which the following facts are abstracted: In addition to the well-known effect of tobacco and alcohol upon the optic nerve, it is pointed out that the drinking of beer and wine leads to changes in the crystalline lens. Deleterious influence upon vision is ascribed also to constricting articles of neckwear, owing to the impeding of the return column of the blood. Touching the question of type-writing, Fox advises that if there is any visual defect, that after the prescription of the proper glasses, if round finger-tips or keys are used, a change should be made to a machine having rectangular keys, which in his experience are the least hurtful to the eyes. Among the concluding hygienic hints, the following are given: Up to forty years of age the eyes should be bathed daily with cold water. After the fiftieth year the eyes should be douched morning and evening with water as hot as can be borne, followed with cold water.

MECHANICAL TREATMENT OF TENSION ANOMALIES.

In the April number of the *Archives of Otology*, Dr. Blake reports some very interesting cases of delicate mechanical corrections of aural conditions due to perverted tension of the tympanic structures. The artificial drum-membrane, so called, is so apt to be a hap-hazard appliance, correctly adjusted by mere chance, if at all, and its precise action probably unrecognized, that aural surgeons are rarely willing to bestow much thought or experiment upon it, leaving that to the random efforts of their patients, stimulated by the roseate circulars of patent drum-makers. The delicate anatomical and physiological adjustments of the ear and its minute derangements call for exquisite refinement of study and experiment for their recognition and correction; and such, as in the past, are here furnished by Dr. Blake. In cases where there was evidence that relaxation of the malleo incudal articulation was responsible for reduced or perverted hearing, he secured relief by placing a spring-like ribbon of rubber-tissue so that its convexity pressed upon the short process, while its ends rested upon the anterior and posterior walls. The position was well retained for varying periods, and one or two renewals were generally sufficient to afford opportunity for the tissues to resume their normal tension. Where relaxation of the drum-head itself was another disturbing factor, the skilful employment of his paper disks was sometimes of great aid to secure the completion of the relief. Only with observant patients can such corrections be made, and then only by extremely delicate and judicious adaptation of the means to the case; yet every one is a triumph of medical skill and deserves careful emulation: and this measure of Dr. Blake's, though not successful in the few cases in which the reviewer has attempted it, is full of suggestion as well as probable usefulness.

MENTHOL IN FURUNCLE AND SUPPURATION OF THE EAR.

In the *Monatsschrift für Ohrenheilkunde* for March, Dr. Cholewa, of Berlin, gives his enlarged experience with this remedy, and renews his commendation of it. In accord with Bronner and others, he has found that it generally cuts short any commencing furuncles, and if continued for a week, even when the disease seemed checked earlier, that it was not followed by relapses. The diffused inflammations of the auditory canal, whether secondary to tympanic suppuration or not, were generally controlled, and the inflammatory narrowing of the canal relieved promptly by its employment in oily solution of ten to fifteen per cent., and serious cases of suppuration with mastoid involvement, that

threatened to require operation, improved beyond expectation, and proved amenable to routine measures. Laboratory tests showed it to have powerful inhibitory or germicidal effect upon surface cultures of staphylococcus and streptococcus, and it has been clinically proved very destructive to the bacilli of diphtheria.

THE ETIOLOGY OF EMPYEMA OF THE MAXILLARY ANTRUM.

In view of the increasing frequency of this condition and its recognition, the report by Kuchenbecker from Siebenmann's clinic, in Basel, upon a series of thirty-one cases, is of decided practical value. Nearly one-third of the cases were of dental origin, only four from certainly nasal causes, three were caused by tumors, and seven were of uncertain causation. Especially interesting are the seven remaining cases in which the empyema could be ascribed to general infective conditions, such as influenza; that the antrum was not secondarily affected from the nasal inflammation was shown by the occurrence of the empyema on the first day of the pneumonia in one case, and of the influenza in five others; the remaining cases accompanied an acute bronchitis. The accessory cavities of the nose have been found acutely inflamed or suppurating in a number of influenza autopsies; and Siebenmann found such conditions in the sphenoids of seven out of eight typhoid cases during the grippe, but only once in nine later. It was highly probable, though not proven, that the Highmore antrum was similarly affected.

THE TREATMENT OF RECENT TRANSVERSE FRACTURE OF THE PATELLA.

BUTCHER (*British Medical Journal*, No. 1635, 1892) objects to Barker's method of treating by operation recent cases of fracture of the patella, on the ground that the operation is not in reality subcutaneous, since an incision two-thirds of an inch is required, this incision being carried into the joint at the lower border of the patella, passing through the middle line of the ligamentum patellæ, and a similar incision is also made into the joint through the quadriceps tendon immediately above the upper fragment. Thus, in the first place, the joint is opened; and, in the second place, a ligature is passed into the joint; and, finally, the knot is placed in front of the knee in a very inconvenient position, especially if a wire ligature be employed and the patient's occupation requires much kneeling.

The operation proposed by Butcher, and successfully employed upon the cadaver, though not upon the living subject, has the advantages that it is strictly subcutaneous, and that it does not interfere with the joint.

Butcher's method is as follows: The patellar fragments are first adjusted by the hands of assistants; then a stout, well-curved needle on a handle is passed through the skin about the centre of the outer side of the knee, and pushed slowly subcutaneously until it reaches the upper border of the patella. The needle is now thrust through the quadriceps tendon as near to the upper border of the bone as possible; then the point of the needle is depressed, and the skin on the inner side of the joint is drawn upward, and the point of the needle, armed with sterilized silk, is forced through the skin on the inner side of the joint; the needle is then withdrawn, leaving the silk in position. The needle is again passed as before from the outer side of joint through the same puncture in the skin as previously, and directed slightly downward until it feels the lower edge of the lower fragment of the patella; it is then thrust through the ligamentum patellæ, and the skin on the inner side of the joint being drawn downward, the point of the needle is then thrust through the same puncture, as will be seen occupied by the silk. The needle, having been passed unarmed, is now threaded with the silk end which protrudes from the puncture, and is withdrawn, with the result that the silk disappears through the opening on the inner side of joint, and the two ends appear at the same puncture on the outer side of the knee.

The broken fragments are thoroughly rubbed together, so as to secure perfect apposition by removal of any clots, etc., that may have intervened. The ends of the ligature are drawn tightly together and knotted, and the knot slips through the puncture in the skin on the outer side, and thus a permanent ligature is passed around the patella subcutaneously. There is no wound to dress, and the joint is not interfered with. The patient is kept in bed on a posture splint for about ten days.

ON RESECTION OF THE LIVER, ESPECIALLY FOR HEPATIC TUMORS.

KEEN (*Boston Medical and Surgical Journal*, vol. cxxvi., No. 17) operated upon a woman, who, on examination, was found to have an

oval tumor about the size of the fist, situated on the right side of the abdomen, about the consistency of the kidney, separated from the liver dulness by an area three fingers broad, of distinct tympanitic resonance. No especially soft portion was found. The case was diagnosticated as probably one of floating and diseased kidney. Chloroform was administered, and a vertical incision was made in the right linea semilunaris, extending from a little below the border of the ribs nearly to the ilium. As soon as the peritoneal cavity was opened, a multiple cystic tumor was seen. This was found to be connected with the liver, involving its extreme right border. At its base, where it joined this organ, it was two and a half inches thick. Just at its internal border was the gall-bladder, which was normal, but so close to the tumor that it was found necessary to dissect it loose for half an inch. The attachment of the tumor to the liver was then cut through by means of a Paquelin cautery. During the course of this operation four very large veins were laid bare, and were ligated before burning through. When the cautery knife had partially divided the pedicle, it was found that it was cutting into cysts of the neoplasm, and that the latter extended as a wedge into the liver to a greater distance internally than was apparent from the outside. Accordingly the liver substance was stripped from the tumor with the thumb-nail. After the enucleation its posterior attachment was burned with the cautery. A few points required extra touching with the dull-red platinum point. The liver stump resembled an amputation with its two flaps. These two edges or flaps were then approximated by five sutures passed deeply through the substance of the liver. The amount of blood lost was not over eight ounces. The belly cavity was flushed with hot water, and the wound was closed after inserting a glass drainage-tube. The operation lasted about an hour. At the end of forty-eight hours the tube was removed. No bile or bile-stained fluid was seen at any time.

On the second day the bowels were moved by sulphate of magnesia, the stools being of a normal brown color. The stitches were removed at the end of a week. The patient went home forty-two days after the operation entirely well, and has remained so to the date of reporting. Microscopical examination of the excised tumor showed that it originated from the bile-ducts, and most probably from the large vasa aberrantia found on the edge of the liver.

A table of twenty cases of resection or amputation of the liver is published with this paper, together with the analysis, which shows that in nearly all cases diagnosis was not made until after the belly was opened.

Keen then discusses the question as to whether or not any large portion of the liver can be removed without a fatal result. Ponfick's experimental research, showing that in rabbits removal of more than three-quarters of the liver is always fatal, is quoted, and also his very remarkable finding that there is apparently reparative power in that organ, whereby hepatic tissue can be reproduced.

Von Meister, experimenting on dogs, cats, and rabbits, found that the removal of three-quarters of the liver was not followed by any serious consequence, and that in the space of thirty-six days repair had advanced so that the weight of the organ was regained. Escape of bile into the peritoneal cavity seems to Keen more of a theoretical than a practical danger, and in only two cases of the twenty was any such discharge observed. This gave no trouble, as it escaped externally in both instances. Pavy has stated that no harm arose from such a free escape of the bile into the peritoneal cavity in his experiments upon dogs; and Lane has also reported a case of probable rupture of the gall-bladder, in which, after five weeks, he evacuated over three gallons of bile-stained fluid, yet the patient recovered.

As to the method of removal, and especially the means of preventing hemorrhage, there was in the reported case absolutely no trouble in this respect. In nine of the tabulated cases after completion of the operation the stump was returned into the abdominal cavity. In three the lips of the hepatic wound were first sutured. Of these nine, all but one recovered. In six cases the stump was sutured to the abdominal wound at the close of the operation. In four the liver was attached to the edges of the abdominal wound before the removal of the tumor. In one case ligation of the pedicle, fixation to the abdominal wall, and immediate amputation of the tumor was practised; but in the other three a true extra-peritoneal treatment was carried out. In one case the operation was performed in two stages,—that is, primary suture to the abdominal wall and a later amputation. In one case of the tabulation the result is not known; of the other nineteen, seventeen recovered. Of the two deaths, one occurred upon the day of operation, presumably from shock; the other on the twelfth day from sepsis.

The conclusions of this paper are as follows:

Both experiments on animals and operations on man have shown that tumors of the liver, and even large portions of the liver itself, can be removed without undue disturbance of the function of this organ; the experimental evidence makes it probable that the liver-tissue may be regenerated and the loss made good.

The escape of bile into the peritoneal cavity is not a usual phenomenon after such an operation; it may generally be prevented by searing the raw surface of the liver, by ligation, or by securing the stump in the abdominal wound. Even if the bile enters the peritoneal cavity, the result is not necessarily fatal.

Hemorrhage need not be greatly feared. The vessels can often be tied separately or in mass, or cut through by the cautery, or controlled by pressure, or by a combination of these means.

Resection or amputation is best done by enucleation, by the cautery, or by the knife or scissors, preferably perhaps in the order named. In case of a tumor with a very large base of attachment, the operation may be done in two stages, the base being surrounded by an elastic ligature in the interval.

The mortality thus far has been only about ten per cent.

GASTROSTOMY FOR ŒSOPHAGEAL CANCER.

Morison (*British Medical Journal*, No. 1636, 1892) operated upon a patient, who, for thirteen weeks, had been unable to take solid food, and for two days had not been able to swallow, even liquids, all material ingested being promptly regurgitated.

On examination an obstruction was found in the lower extremity of the œsophagus. Gastrostomy was performed in two stages. At the time of the operation the cardiac end of the stomach and the anterior wall of this organ were so extensively infiltrated by malignant growth that it was necessary to draw the greater curvature forward, and, after separation of the omentum, to attach it to the abdominal wall. The opening into the stomach was made three days after the primary operation. The patient steadily improved, resumed his trade after a time, and lived for four hundred and seven days after the operation.

THE UNION OF DIVIDED TENDONS.

Busse (*Deut. Zeit. f. Klinische Chirurgie*, xxxiii. 1, 1891, and *Annales d'Orthopédie*, tome v., 6 année, No. 5) finds, as the result of repeated experiments, that in cases of tenotomy, immediate complete union is never obtained. Even when the ends of the divided tendons are sutured, exact apposition never persists. An extravasation of blood filling up the space between the divided ends of the tendon is utterly useless; in fact, it retards cicatrization, which does not begin until the clot is absorbed. Union is very much more rapid when the wound is rendered bloodless and when no clot is present. The peritendinous and interfascicular tissues furnish by cellular proliferation the splint which unites the divided tendon. This splint requires many months to become identical in structure with the tendon.

THE RESULTS OF OPERATIONS ON THE GALL-BLADDER.

Terrier (*Le Progrès Médical*, tome xv., No. 18) has performed eight cholecystectomies, one cholecystotomy, three cholecystostomies, one cholecystenterostomy, and one choledochotomy.

Of the eight cases of cholecystectomy, seven recovered. The first was performed in 1886, and has been well since that time. In the case of cholecystotomy, the adhesions were so tight that the gall-bladder could not be sutured to the abdominal walls. This patient died. All three cases of cholecystostomy recovered.

In the case of cholecystenterostomy, operation was required on account of an obstructing tumor at the head of the pancreas. The patient lived six months after surgical intervention.

Terrillon has practised cholecystotomy, with complete success in six cases, a permanent fistula in the seventh, and a failure, due to the fact that on account of adhesions it was impossible to complete the operation.

Leonté, as a result of his study of the subject, announces that surgical intervention is indicated in cases of permanent occlusion of the biliary passages; that the operation is not a serious one; that, when possible, primary cholecystectomy should be avoided, cholecystotomy being preferable; that cholecystenterostomy is indicated in cases when extirpation is not possible, and in all instances where operation is indicated the gall-bladder should

be opened, since external examination through an abdominal opening is not sufficient.

Michaux performed cholecystectomy in two cases. Both resulted in cure.

Richelet performed cholecystenterostomy in one case. The gall-bladder was secured to the duodenum. The results were not very satisfactory, biliary retention persisted, and a second laparotomy was performed; the gall-bladder was opened, and an effort was made to extract the calculus. This resulted in a hemorrhage so severe that death resulted in an hour. At the autopsy it was found that the forceps had seized a calculus, which was so firmly adherent that its displacement had caused tearing of the gall-bladder, and had resulted in hemorrhage.

Boeckel reports a case of cholecystotomy operated on ten years ago and still perfectly well. The second case has remained well for two years. The third case perished. Three unsuccessful cases of cholecystostomy are also reported by this operator.

THE CURE OF RECURRENT LUXATIONS OF THE SHOULDER BY PERIARTICULAR INJECTIONS OF CHLORIDE OF ZINC.

DUBREUIL (*Annales d'Orthopédie*, tome v., 6 année, No. 6) saw a patient, a healthy man, who in two and a half months luxated his shoulder five times. This accident happened first from throwing a stone. The reduction was easy. The next time the patient was pulling a wagon; reduction in this case was more difficult. The third time the accident happened from a sudden motion of abduction. The displacement was subcoracoid. By means of traction the bone was finally replaced. Twice more displacement occurred, being caused by motions of abduction both times, and replaced only by forcible traction. Since, on account of the liability to luxation, this patient was unable to earn his living, an effort was made to overcome the tendency to displacement. From the 5th to the 16th of January six injections each of 2 drops of a ten per cent. solution of chloride of zinc were driven into various portions of the anterior superior portion of the capsule below the acromion. All antiseptic precautions were taken during these injections. They were followed by very slight pain and no distinct inflammatory reaction.

After this treatment the patient could make forced movements in all directions without reproducing displacement, no traces of his former trouble remaining, excepting some slight crepitus during the movements of abduction. This crepitus was produced in the acromio-coracoid bursa.

TREATMENT OF PURULENT PLEURISY.

DE GASSICOURS (*Revue des Maladies de l'Enfance*, tome x., February, 1892) reports ten cases of purulent pleurisy treated in accordance with the principles laid down by Breton, seven of whom recovered. One of the deaths was due to diphtheria. In nearly all the cases the pus contained pneumococci, usually in pure cultures. This always should be regarded as a favorable prognostic sign. Both the fatal cases were suffering from tuberculosis. In those cases of pleurisy in which the pneumococci are the causative agents, cure from puncture can be hoped for, often a single puncture being sufficient. Usually more will be required. Three successive punctures should be made, practised at five days intervals. If after the third puncture—that is, after fifteen days—pus is found still present in large quantity, formal operation for empyema must be undertaken. When streptococci are found together with the pneumococci, the prognosis is far more serious. Even in this case it is possible that punctures alone may cure, but formal operation is usually required.

TRAUMATIC HYDRONEPHROSIS.

COLLINS (*British Medical Journal*, No. 1635, 1892) reports three cases of hydronephrosis. In the first case, the child, aged 5, sustained a fracture of the pelvis, and was brought into the hospital in collapse. From this it recovered, but later hydronephrosis developed, the tumor being present in the right loin. It was tapped and aspirated sixteen times, the quantity of liquid steadily diminishing. This case entirely recovered.

The second case, a man, aged 36, was injured by a fall. Shortly afterwards swelling was noted in the left loin, which was aspirated seven times during five months. From this time he continued well for eleven years, when he suffered from pain in the abdomen and in the lumbar region, with obstinate constipation. Increased resistance and fluctuation were detected in the left ilio-costal interval. By aspiration thirty-four ounces of opaque fluid containing fetid pus were withdrawn. An incision was then made, the sac was drained, and the patient recovered.

The third case was injured by a fall. The hydronephrosis never reached any very great development, and subsided without surgical treatment.

The author ends his paper with the following conclusions:

1. "Traumatic hydronephrosis," or hydrorenal distention, the result of the proximate or remote effects of traumatism upon the perviousness of the ureter, must be distinguished from cases of encysted extravasated urine causing loin tumors, the result of partial or complete rupture of the ureter.

2. Traumatic hydronephrosis may arise acutely from blood blockage of the ureter, or, more slowly, from bruising of the ureter, resulting in ulceration and stricture, similar to the more familiar process in the urethra. Possibly, also, from results of pelvic fracture or bruising by virtue of extrinsic pressure by blood clot, inflammatory products, or callus.

3. Traumatic hydronephrosis may result in spontaneous cure, least probably when confirmed and chronic; or, if in the latter cases, spontaneous cure result, it will be in the sense of destruction of the secreting renal epithelium and obsolescence of the kidney. Massage may facilitate the restoration of the perviousness of the ureter.

4. Aspiration is valuable to relieve dangerously rapid kidney distention following injury. In the first case, it facilitates the shrinkage of the kidney sac, while permitting sufficient tension on the renal epithelium in the intervals to effect its destruction, at the same time permitting the gradual assumption of double duty by the opposite kidney.

5. When there is reason to believe that the condition is one of pyo-hydronephrosis, where nephrectomy is inadmissible, and when the patient's general health is suffering, nephrotomy, stitching the sac to the parietes, and drainage are indicated. When the urethral block is permanent, the persistence of a urinary fistula is probable, because we have then lost the beneficial destructive influence of tension. In the second case, the adhesions and relations of the sac in a man not overstrong, and whose kidney was not eliminating the normal amount of urea, indicated drainage rather than nephrectomy or aspiration.

6. In the cases of pseudo-hydronephrosis from ruptured ureter, incision and drainage must almost certainly be called for sooner or later by inflammatory consequences. If at the operation it is evident that the rupture of the ureter is such as to render the likelihood of restoration of its function improbable, the removal of the kidney, as in Barker's case, would seem to be strongly indicated. Such cases should offer the best results for nephrectomy, and would hardly be liable to the heavy rate of mortality referred to that operation when the nature of the cases for which it is performed is undistinguished. Each case, however, should be judged upon its own merits before nephrectomy is advised. It is, however, obvious that the logical choice is rather between aspiration and nephrectomy than between nephrectomy and either of the other procedures.

A CASE OF IODOFORM-POISONING.

Dr. P. Näcke gives (*Berliner Klin. Wochenschrift*, February 15, 1892) an interesting account of his own experience of iodoform-poisoning. Having been attacked by an acute general eczema, which, beginning at the genitals, extended to the thighs, a high fever set in. To prevent infection from the places where the skin had been scratched off, they were bandaged at first with corrosive sublimate dressings, and then dusted with iodoform; this was first done on the second of March. Seventy-five grains of pure iodoform were used, followed by a mixture of the same quantity with starch. The total amount used was from two to two and a half drachms.

Ten days later there occurred suddenly a profound loss of consciousness, which lasted just four days; all memory and perception disappeared, so that the patient himself can remember almost nothing of those days, and can only report them by referring to his physician and his wife. Even the memory of passing events was lost, scarcely out of a sitz-bath, he would demand the bath, quite unmindful that he had just enjoyed one. Faces were forgotten, and persons as well; repeatedly he asked his wife who he was, and sense of locality was so far gone that he believed himself in a hospital. Word-memory was lost, too, or there was utter inability to produce the words desired, calling articles by wrong names. What he wished could only be learned by gestures. In general he was quiet and had no hallucinations. Intelligence was much affected. The temper was also affected. Now he wept without cause, again grew angry on slight pretext, or lay entirely apathetic.

The disturbance of consciousness disappeared very slowly, although the physical strength was soon regained. Memory remained long impaired, every thought seemed to be erased;

the simplest prescription could not be recalled. Memory of passing events was regained very soon. The sense of locality was still lacking, and intelligence was weak.

When consciousness had partially returned, there was a most unpleasant smell and taste of iodoform; the former became, later, an ill-defined balsamic odor, and finally one of ether or fresh air. An intense sleeplessness was most tormenting, nothing cured it, and it was accompanied by hypochondriasis.

Early in June he went to Kadner's Sanitarium at Kötzschenbroda, where he remained eight weeks. A treatment of mild baths and douches, massage, gymnastics, and a suitable diet was very successful.

As is so often the case with neurasthenics, an excess of phosphates and uric acid were found in Näcke's urine. For weeks he only slept under hypnotics; but the doses were constantly diminished until they were simply suggestive; after the sixth week he could sleep naturally at least from four to six hours. The bowel was very sensitive, diarrhœa occurring easily, and an acute external hemorrhoid formed. The heart and vessels were very irritable, especially in the last two weeks. The pulse was constantly at about ninety, but rose rapidly upon the slightest muscular effort or excitement, rising once to 120 after the performance of a symphony. A sojourn in spicy mountain air completed the cure, and after four and a half months he was able to resume his profession, quite satisfied with his health, save for occasional sleeplessness and neurasthenic symptoms, which, however, are rather better than before the poisoning.

The many recorded observations of severe poisoning show plainly that iodoform, although so extensively used, is not harmless. Hence all efforts to replace it by a less harmful drug are commendable.

It is well that as far as possible all cases should be reported, so that they may serve as a repeated warning to physicians when iodoform is to be used in large quantities.

THE MECHANICAL TREATMENT OF ERYSIPELAS.

Dr. Hermann Kraell (*Therapeutische Monatshefte*, February, 1892) calls attention again to his method of treating erysipelas. He believes that the bacilli are much hindered in their progress when they encounter the firmer portions of the skin. With this in view he made use of an elastic band, encircling the head with it at the edge of the hair. In only one of his cases did the erysipelas extend upward beyond this barrier. The elastic must press quite firmly against the head. The disease may then spread over the whole face without extending into the hair at all. The spreading being thus prevented, the fever will last until the life process of the streptococci is over. The band must not be removed at once upon the cessation of fever, but be retained until the swelling and bluish-red color have disappeared from the artificial border.

Many patients find the band very unpleasant, but one who had, on a former occasion, had the disease spread all over the head, declared that the tension was not to be compared with that produced by the disease itself.

One woman carried for some time a red line across her forehead where the diseased area had pressed against the band.

A RESEARCH ON THE POISONOUS NATURE OF MOULDY RICE.

Dr. J. Sakaki, in the *Sei i-kwai Medical Journal*, reports the results of his study upon the action of mouldy rice. The research is particularly interesting because it has been thought by students of the disease known as *kakke* that mouldy rice was the cause. From the experiments which Sakaki has made upon frogs and rabbits, it would appear that the poison is capable of producing, in the case of the rabbit, dyspnœa, rapid pulse, pupillary dilatation, and paralysis, the animal dying in convulsions in from three hours to forty-five minutes. In the frog it caused paralysis of the forelegs and loss of reflex activity. Finally the batrachian was unable to recover its former position when placed on its back. Respiration became feeble and only very severe stimulus elicited any response.

DERMATOL NOT AN INVALUABLE SUCCEDANEUM FOR IODOFORM.

The *Revue de Thérapeutique Général et Thermale* contains an article, in which it quotes the results obtained by Glaeser in the Gynæcological Clinic of Breslau with dermatol, the new cicatrizing agent, discovered by Heinz and Liebrecht. The conclusions which are reached are formulated as follows: Dermatol is a remedy which can be readily employed because of its inoffensive odor, and the effect which it exercises upon fresh and aseptic wounds. It is not applicable to phlegmonous wounds, or to abscesses, nor does it combat prolonged suppuration. It is useless

to employ it in cases of torpid ulcers or in cases of defective granulation tissue. It does not possess the specific anti-tubercular action of iodoform.

Weismüller also reaches the conclusion that dermatol cannot be used as a substitute for iodoform, and he relates the case of a man, aged 38 years, who had been affected for a number of years with ulcers of the limbs, which gave him great pain, and produced morbid secretions abundantly. Good results did not follow the application of dermatol. On the contrary, its use was followed by itching and vertigo. Under the influence of a powder made up as follows, the ulcer upon the left limb healed up in three weeks, and those upon the right limb were much improved:

℞ Acid salicylic, 5 parts;
Boric acid, 3 parts;
Oxide of zinc, 2 parts;
Powdered starch,
Powdered talc, aa 20 parts.

The conclusion, therefore, is that dermatol cannot be used as a succedaneum for iodoform, and also that it is not an inoffensive substance.

[Dermatol, it will be remembered, is the sub-gallate of bismuth.—ED.]

TREATMENT OF POISONING BY COCAINE.

ELOY, in the *Revue et de Clinique et de Thérapeutique*, for December 30, 1892, gives the following directions for the treatment of acute poisoning by cocaine. The patient is to be placed in a horizontal position in order to prevent syncope, and his face is to be bathed with cold water. If convulsions come on, cold should be applied to him. If asphyxia is present, flagellation, massage, and artificial respiration are to be resorted to, and if the respiration depends upon the tetanic contraction of the respiratory muscles inhalations of chloroform are to be employed. For the intense pallor it is well to give inhalations of nitrite of amyl, which will provoke vaso motor dilatation and so diminish arterial pressure in the large vessels by increasing the peripheral circulation. Should these means prove insufficient, it may be well to administer to the patient strong coffee or caffeine, or, if swallowing is impossible, hypodermic injections of ether may be used. In other words, the entire object of the treatment is to moderate the reflex excitability of the nervous system, to sustain the heart, and to re-establish the equilibrium of the circulation. Therefore, the treatment of acute cocainism is to be particularly directed to the arterial system.

ACONITINE IN THE TREATMENT OF ERYSIPELAS.

According to the *Journal de Médecine de Paris*, TISON treats cases of erysipelas in the following manner: At the onset of the disease, for the intensity of the fever, he administers an emetic and also produces catharsis, after which he administers aconitine in the dose of $\frac{1}{200}$ of a grain every six hours. The drug must be pushed actively in order that its full physiological effect may be shown. At the same time that the aconitine is given the part which has been invaded by the erysipelas is washed every two hours with a cloth soaked in sulphuric ether which has been saturated with camphor. The application is not disagreeable to the patient, as the cold caused by the evaporation of the ether gives comfort and the ether evaporating leaves upon the surface a fine covering of pulverized camphor which removes the pain.

PERMANGANATE OF POTASSIUM IN THE TREATMENT OF DIPHTHERIA.

Diphtheria is so prevalent a disease in Australia that the Australian medical journals constantly teem with articles upon its treatment. One of the most recent of these is that of DR. BOWMAN upon the employment of permanganate of potassium in the local treatment of the disease. He reports seventeen cases, six of which were in adults and eleven of which occurred in children under ten years with uniform rapid cure in from two to eight days. He finds it best to use a solution of the strength of 3 grains to the ounce, which is just half as strong as Condy's fluid. From three to four applications are made directly to the membrane with a large camel's-hair brush every hour for eight or twelve hours. It is necessary to have a thoroughly saturated brush, which, however, must not be wet enough to drip, as, in the case of infants, if much of the fluid is swallowed vomiting comes on. After the frequent applications have been made during the period named, the painting should be continued at from two to six hour intervals until the membrane, which is now quite black, breaks away. Associated with this treatment, iron is administered internally and a nourishing and stimulating diet provided.

In the discussion which followed the reading

of Dr. Bowman's paper, Dr. Furnival stated that he had used this treatment, always with marked success, and that after having employed other remedies, he had discarded them for the treatment which was now under discussion. He thinks that in some instances the use of a spray is a better way of employing the permanganate solution than the swab. Other speakers agreed with Dr. Furnival that the spray was the better method of application.

In closing the debate Dr. Bowman stated that he had used permanganate of potassium in the strength of 6 grains to 1 drachm without having caused redness and irritation.—*Australian Medical Gazette*, February, 1892.

PIPERAZINE.

DRS. BIESENTHAL and SCHMIDT review, in the *Berliner Klinische Wochenschrift*, January 11, 1892, the clinical reports on piperazine which have appeared recently. The reports of Vogt, Ebstein, Heuback, Krakauer, and Brik (see *Therapeutic Gazette*, February, 1892, p. 114) are all very favorable. Testimony seems to be nearly unanimous that the remedy is harmless and that it is effective as a solvent of uric acid.

Biesenthal and Schmidt report seven cases in which the remedy has been tried. Four of the cases are given in detail. In three of the latter, who were gouty patients, and had attacks of gout, marked relief was obtained. The fourth patient had violent attacks of renal colic. On the first day the piperazine was used, an extraordinary quantity of gravel was passed. After the second dose, on the next day, large quantities of gravel were passed several times, and almost immediate relief was experienced. Similar results were obtained in other cases. Biesenthal and Schmidt recommend the remedy very highly.

Internally, they say, piperazine is best given in dilute solution in doses of fifteen grains distributed during the day. Its taste is very slight. As it is not irritating to mucous membranes, a one or two per cent. solution may be employed in washing out the bladder in the case of vesical calculi. Hypodermic injections into gouty deposits and local applications to gouty swellings may also be employed.

CRANIECTOMY.

MR. VICTOR HORSLEY recently performed the first stage of the operation of craniectomy on a child, aged about two years. He remarked that he operated in stages, because he found that the entire process of removing a long strip of bone at one sitting was apt to set up a large amount of hyperpyrexia in the little patients, in fact, he had lost one case through this very cause, so he now commenced by only taking away a disk of bone with the trephine. The case under consideration was one in which most of the mischief was in the frontal region, and was one of those, as Mr. Horsley pointed out, in which the operation was not so favorable, although still very useful, as, in his opinion, when the special centres were well developed and the disease itself limited to the frontal region the benefit resulting from craniectomy was not so great; however, the child in the present instance had, independently of other symtoms, been very restless and violent, under which circumstances he deemed it better to operate, whatever the state of the skull, as indicated also by the observations of LANNELONGUE. He found the frontal bones on a lower level than the parietal at the suture, which formed a kind of ridge, and he thought that the forceps had been used for the delivery. After the disk of bone had been removed the brain bulged at the hole, though little more than it would have normally. The bone itself was thicker than is usual to find. No further report is given of this case in the *Medical Press and Circular* of January 20, 1892.

HABITUAL CONSTIPATION.

DR. ISING reports (*Blätter für Klin. Hydrotherapie*, December, 1891) some cases of chronic constipation.

Two patients had had absolute obstruction for some days, so that symptoms of incipient paralysis of the bowels were present. Severe meteorism, vomiting, oppression, anxiety, loss of strength, cold sweat, feeble pulse were caused by the enormous hard, dry masses found in the rectum. In view of the necessity of immediate relief, two pieces of wood were shaped like a glove-stretcher, the ends smoothed and oiled.

Ising introduced this through the sphincter and into the fæcal mass, and stretching the sphincter energetically, began to loosen the hard masses. In about twenty minutes very offensive gas was given off; he then withdrew the instrument, gave an enema of cold water, and kneaded the belly with a cold wet cloth wrapped around the hand. The bowel was quickly emptied and comfort restored.

Dr. Ising also calls attention to the not infrequent cases, in which, in spite of daily pas-

sages or even diarrhœa, there are accumulated fæcal masses, causing the patient much trouble.

The objective symptoms are usually: facies hippocratica; no fever, empty note over abdomen, except a small region about the small intestine and the stomach, which has a tympanitic note; doughy consistency of the abdomen; resistance along the colon, often throughout its whole extent; colic-like pains. The patients complain of discomfort in general and disturbance of digestion.

Mild cases of this sort are quickly cured by the use of massage, faradization, and hydrotherapeutic procedures.

All these means were used in vain for one patient. This man refused all food and suffered so intensely that he required two injections of morphine daily. After twelve days the patient sent, by telegraph, for his favorite old cognac, of which he drank a small glass each hour, which caused him to pass great quantities of thin excrement in which were mixed tough, knotty masses. The pains ceased and the patient's appetite returned.

Reviews.

A System of Practical Therapeutics. Edited by Hobart Amory Hare, M.D., Professor of Therapeutics and Materia Medica in the Jefferson Medical College of Philadelphia; assisted by Walter Chrystie, M.D., formerly Instructor in Physical Diagnosis in the University of Pennsylvania. Vol. II. Fevers; Diseases of Respiratory System; Circulatory System and Hæmatopoietic System; Diseases of the Digestive System. With illustrations.

Philadelphia: Lea Brothers & Co., 1892.

The second volume of this work carries out the plan of Vol. I. still more completely. It presents us with a unique system of therapeutics, in which drugs are studied in their relation to special diseases. To the poor diagnostician, if any such there be, the book will probably prove a mystery and a stumbling-block; but to the well-trained observer it will afford just what he wants, easily reached, and save him many hours of misapplied study. The authors of the various articles have caught the spirit of the work, and have written in the highest therapeutic vein, with broad view, and unhampered by any technical study of drugs and the abstract action of drugs.

The book opens with an article on "Syphilis," by Dr. Robert W. Taylor, Clinical Professor of Venereal Diseases in the College of Physicians and Surgeons, New York. This will be found to contain a very complete study of the treatment of syphilis, and represents fully the finished view of the day. The author is very decided in his opinion of the folly of any expectations from the abortive treatment, and inclines to the use internally of protiodide and tannate of mercury in preference to other agents, relies upon inunction and the hypodermic use of mercury subsequently, and in the face of grave emergencies requiring speedy action. Fumigation, both local and general, is thoroughly illustrated, and a very careful and interesting study of hypodermic injections and their value in syphilis is given, this subject alone occupying between forty and fifty pages.

"Scarlet Fever, Measles, Rötheln, and Varicella" form the subjects of the article by J. Lewis Smith, M.D., whose name is enough warrant for the value of what he says. Under scarlet fever the question of secondary infection from the pharynx is discussed, with all its therapeutic lessons; and the article is particularly valuable for its treatment of scarlatinal complications and sequelæ.

"Small-pox" is the subject of Dr. Wm. M. Welch's article, which appropriately opens with the topic of vaccination, for which he gives a very strong and urgent plea, evidently favoring compulsory vaccination when it can be attained. Perhaps enough has never been said about the value to the community of a real comprehension of the pecuniary loss which it sustains from small-pox epidemics, and the saving to be effected in this direction by well-timed, and apparently lavish, expenditure. As almost all epidemics gain their foothold among the poor and ignorant, our laws seem to foster concealment. The stricken families dread the doctor and the health-officer, and, above all, they and their families dread two things,—loss of work and wages on the part of the well, and loss of property from the removal of infected articles. Payment of enough to support life by city and town authorities, and the purchase at a fair valuation of infected household effects, while apparently expensive, would be cheapest in the end, and would do away with concealment, which is the most dangerous factor in the spread of epidemics.

In regard to treatment, Dr. Welch gives us both the standard treatment of the past, and the modifications which antisepsis and bacteriology have introduced. He says, "I find that the antiseptic treatment of small-pox is nothing more than the revival of an old practice, which for many years was abandoned."

And further on we find him describing almost all the methods which have been advocated as disappointing, and falling back upon the general principles which have guided the profession in the last twenty years or more.

"Typhoid Fever" is by Frederick P. Henry, A.M., M.D. This is also a strictly therapeutic article in its largest sense. The question of the bacillus coli communis in its relations to typhoid is discussed carefully, and the question of contagion is enforced by a study of the epidemics of Geneva, and Plymouth, Pa., and the experiments of the Paris municipality. The questions of milk-supply, air conveyance, and subsoil water are all carefully considered. In diet, milk and its limitations is studied, and the use of more water internally, as tending to check parenchymatous degenerations, is strongly recommended. Gelatin is evidently a favorite food with the writer, but exactly what gelatin he neglects to state, and this is by no means unimportant, for owing to the method employed in making it, and the condition, sometimes, of the material out of which it is made, it is quite possible for it, while odorless, transparent, and apparently pure, to yet contain ptomaïnes in appreciable quantity.

The antipyretic treatment receives a very favorable consideration from the author, who describes fully its use, its fall from favor, and its recent rise. Dr. Caley, whom he quotes as an advocate,—as he undoubtedly was,—however, did say that, with all his prejudice in favor of cold baths, he wished, if he himself were sick, to be treated by one who did not employ them. For internal medication, Dr. Henry considers the safest antipyretic, quinine. For intestinal antisepsis, thymol is his favorite,—a drug which generally, if early administered, prevents typical symptoms. Laparotomy for perforation he decidedly condemns, and uses massive doses of opium.

The article on "Typhus Fever," by Manuel Dominguez, M.D., presents peculiarities of such a character that it can scarcely be considered as a standard monograph upon the subject. As a description of the disease called *tabardillo* in Mexico it would have done better, but when we find the writer discussing gravely the question of whether it is contagious, and differing from many of his colleagues who deem it miasmatic, we begin to see that he is describing something quite unlike the typhus of Europe, and whilom of North America. He also seems somewhat at variance with general authority on the question of contagion and infection. "Infection," he says, "consists in the absorption of a miasmatic agent which lives, develops, and dies in the new organism to which it has been transmitted." "Intermittent fevers, for example, may be classed among infectious disorders." Again, we find: "There undoubtedly exists a special miasm. . . . Montano believes it the same micro-organism that causes the different types of intermittent fever." This disease, which divides the territory with yellow fever,—one beginning where the other stops,—is certainly not our typhus. Yet the petechial eruption, the characteristic odor, and many other enumerated symptoms resemble it. Its duration he gives at fourteen days, and rarely going beyond twenty-five. The writer himself recognizes that he is describing a disease which differs from the typhus of Europe; hence we consider the name of the article as misleading. We cannot refrain from closing the notice with the author's favorite treatment, which is "rationally expectant," acidulated drinks, alkaline mouth-washes, cold enemata of a decoction of illesebram achyrantha, or better known as tianguis pepetla, a "light diet of eggs, milk, tea, and meat," and where high fever exists in the ataxic form, tepid baths, and antipyrin, 7 grains every half hour, "carefully watched by the aid of the thermometer." Typhus fever, the author sadly adds, is "a treacherous disease."

"Malarial Diseases and Dengue," by George Dock, M.D., brings the subject up to the most recent observations, and confines it closely to a therapeutic stand-point. The study of the action of quinine, with which the article opens, will be read with interest by many.

"Yellow Fever," by Jerome Cochran, M.D., gives us, among other interesting points, the "treatment adopted in Havana," giving the actual words of his correspondents, and follows this by what he terms "the American treatment."

"Cerebro-Spinal Fever," by Dr. J. C. Wilson, gives us a very conservative view of the treatment of this malignant disease. The summary of the author's conclusions differs but little from the standard treatment of the last thirty years,—blisters to the occiput and opium in very large doses. The author believes that some valuable use may be made of the new antipyretics,—though without personal experience,—for it should be remembered that the last real outbreak of any extent in this portion of the United States was nearly twenty years ago.

Under "Diseases of the Nasal Chambers," Dr. Ralph W. Seiss has brought together the treatment of acute coryza, idiosyncratic coryza (by which name the author means hay-fever), simple chronic rhinitis, chronic hypertrophic rhinitis, inflammation of the pharyngeal tonsil, sclerotic, syphilitic, and tubercular rhinitis, and diseases of the maxillary sinus. The article is excellently illustrated and exceedingly valuable.

Dr. Charles E. Sajous writes on "Diseases of the Pharynx and Larynx." In hypertrophied tonsils, while mentioning everything else, the author fails to recognize the value of bromide of potassium locally, as employed by the writer for the past fifteen years. This blanches the tonsil, cuts off some of its blood-supply, and where caustics have not been used, will in a large percentage of cases render operation unnecessary.

"Diphtheria and True Croup" is by Dr. J. Chalmers Cameron. The author gives us a comparatively brief but very able article in regard to detention from school and the general isolation of the convalescent; he raises the question as to how long such isolation should be kept up. This, he says, is a difficult problem to solve; but it seems to us that its proper solution, courageously carried out, would do more than any other one thing to stamp out the disease. Schools and Sunday-schools are the great sinners. Dr. Cameron says, "It has been shown that at least eight days must elapse after the disappearance of all local manifestations;" but what, he asks, are local manifestations, and when are we to say that they have ceased? We think Dr. Cameron has indicated altogether too short a time, for, in speaking of Löffler's recommendation of four weeks from the commencement of the attack, he says, "This cannot safely be adopted, as a working rule," and that each case requires separate decision in regard to this question. He advises bacteriological examination of the affected parts and discharges; but it seems to us that a good time limit—long enough to cover all cases—would be better.

For treatment, hydrogen peroxide is considered by the author as the best local application, mercury bichloride the best internal remedy. While praising the tincture of iron as more generally useful than any other drug, it does not seem to have occurred to him to unite the mercury bichloride with it in the same formula; yet this, on chemical grounds alone, should be generally accepted, as preserving the bichloride in a condition of activity. In laryngeal diphtheria, he says, "Notwithstanding the high praise given to the drug,—the bichloride,—it does not seem to produce such uniformly good results as tincture of the chloride of iron. This strikes us with surprise, and leads us to think that there must be additional value in the union of the two remedies, and that Dr. Cameron has, perhaps, given the bichloride in too hesitating a way; indeed, the doses he mentions are rather small. Intubation and tracheotomy afford, the author thinks, about equal chances, and, considering the simplicity of the former, he decidedly inclines to it in most cases of need.

"Asthma, Acute and Chronic Bronchitis, and Whooping-Cough" is by James T. Whittaker, M.D. The author, in acute bronchitis, seems to have forgotten ipecac and the alkalies, and ignores the remarkable results from the atomization of ipecac, obtained recently by Wm. Murrell, of London. Under asthma no mention is made of grundilia and quebracho, and in whooping-cough, with quite considerable space devoted to history and progresses, etc., we miss the mention of some valuable remedies. The dose of morphine sulphate, given on page 553, with no age specified, seems too large; and we find the author using—page 555—a peculiar fluid iodide of potassium, which must be very, very recent. We are told that "saturation with the bromides is the treatment now most in use," but we find no mention of quinine in full doses, which has hardly an equal, cutting short uncomplicated cases in a few days if steadily pushed, and doing as well for the cases complicated with bronchial catarrh as anything can. Chloral is mentioned as "having at one time high laudation." Whereas, in strong children, it possesses great value, we did not notice any mention of antipyrin, which internally and by the spray has been highly praised.

The group of articles on "Diseases of the Chest" continues, with Dr. M. Howard Fussel's "Pulmonary Emphysema, Atelectasis, Abscess, and Gangrene," and Dr. Edwin E. Graham's "Croupous and Catarrhal Pneumonia." The latter comes at a time when the general profession seems somewhat disturbed and uncertain on the subject, and when many feel that there is urgent need of some decided view, and some definitely determined treatment, whereas every man is too inclined to do what is right in his own eyes. The author favors cold baths and compresses rather than the pack in the

management of pneumonic pyrexia. In dyspnœa, when urgent and threatening, bleeding is cautiously recommended. Tartar emetic and veratrum viride are generally "to be avoided." The latter may be used in the early stages. Aconite is never recommended.

In catarrhal pneumonia the author again urges cold baths and compresses, considering it strange that America should be so slow to adopt the recommendation of foreign observers.

"Diseases of the Pleura" is by Rudolph Matas, M.D.; "Acute and Chronic Organic Diseases of the Heart," by W. H. Thomson, M.D. These are two excellent monographs; and "Nervous Diseases of the Heart," by T. Lauder Brunton, M.D., etc., completes the group. The latter will prove of especial value as presenting in concise shape our present knowledge of the heart's venous supply, and in throwing all the light now possible upon a subject concerning which the average practitioner is often found to possess but a very vague idea.

"Diseases of the Blood-Vessels" and "Diseases of the Blood" are treated of by Dr. Frederick C. Shattuck in two consecutive articles of great excellence. Dr. J. H. Musser, in his article on "Diseases of the Liver, Gall-Bladder, Hepatic Ducts, and Spleen," has perhaps the very best excuse possible for the fact that to reach the therapeutic department he is necessarily obliged to make a somewhat complete study of the diseases of the liver. Notwithstanding "scepticism regarding biliousness," he has had the courage to discuss thoroughly and acutely this evasive condition and its causes and treatment. For this very reason his article will prove invaluable to residents of this particular part of the world. We were particularly pleased with the section on "Diet in Liver Disease." The author perhaps fails to lay sufficient stress on the value of vegetable acids, especially in bilious diarrhœas of the "morning diarrhœa" type, since in vegetable acids we possess the only known therapeutic means of limiting and diminishing the hypersecretion of bile so often consequent on habitual excessive losses of that secretion.

The remainder of the volume is occupied by Dr. Richard C. Norris's "Diseases of Thymus and Thyroid Glands and Exophthalmic Goitre;" "Diseases of the Mouth and Salivary Glands, including Mumps," by Dr. A. D. Blackader; "Acute and Chronic Gastric Catarrh, Gastric Atrophy, Ulcer, Cancer, and Gastric Dilatation," by D. D. Stewart, M.D.; "Cholera Morbus, Cholera, Cholera Infantum, and Dysentery," by Dr. Frederick A. Packard; "Obstruction of the Intestines," by Dr. Edward Martin; "Peritonitis, Apendicitis, and Perityphlitic Abscess," by Roswell Park, M.D., and "Diseases of the Rectum and Anus," by Charles B. Kelsey, M.D. This group contains about all that can be said therapeutically upon the topics indicated, and the articles are all of exceptional merit. Dr. Edward Martin's "Intestinal Obstructions" presents the subject clearly and briefly, and incidentally becomes of great value as teaching the diagnosis of the varieties of obstruction as well as their therapeutics. Dr. Packard, in treating of cholera infantum, urges the treatment concerning which so much has been written in the last few years,—of salicylate of sodium,—which he has used with remarkable results. In the section on dysentery we notice the author's use of cold water in administering the creolin enemata, about the value of which he seems somewhat sceptical. Water at the temperature of the body is always better when large enemata are to be given in an irritable rectum, provoking far less expulsive effort. Dr. Kelsey's article, in addition to being very exhaustive, is also very profusely illustrated.

In summing up the contents of Vol. II. of this "System of Therapeutics," we fancy that the reader and student will be inclined to give it even higher praise than was awarded to Vol. I. The articles are necessarily more practical, from the nature of their subjects, and uniformly seem to have been limited as far as compatible with excellence to the therapeutic side. E. W. W.

DISEASES OF THE NERVOUS SYSTEM. By J. A. Ormerod, M.D. (Oxon.), F.R.C.P. (Lond.). Illustrated. Philadelphia: P. Blakiston, Son & Co., 1892.

The preface of this little book of three hundred and thirty-five pages so admirably describes the position which it occupies in medical literature that we have inserted it in this review.

"The subject of nervous disease, attractive though it be, is apt to inspire the beginner with a feeling of dismay; it grows so fast, it has so many roots and branches, it presupposes so much knowledge, and demands so much expenditure of time. Thoroughly to grapple with it, he will, indeed, require much patient clinical work, as well as study of those excellent and elaborate treatises which happily exist. This little volume is offered to

him as no substitute for those, but only as an introduction to his work and outline map of territory to be acquired; and should it thus prove to him, perhaps by its very smallness, an encouragement and aid, then it will have served its end."

Careful examination of the pages of the book shows that its author possesses the qualities necessary for the lucid presentation of the difficult subject of neurology. The book is all that its author claims for it, and while, as he says, it cannot and will not take the place of such standard works as that of Gowers, it will prove of much value, we are sure, to the younger members of the medical profession and to those who, while not devoting themselves to neurology, are, nevertheless, interested in it because of their connection with collateral branches of medicine.

THE PRINCIPLES AND PRACTICE OF MEDICINE. DESIGNED FOR PRACTITIONERS AND STUDENTS OF MEDICINE. By William Osler, M.D.
New York: D. Appleton & Co., 1892.

When one who is widely recognized as being the best type of American physician, both socially and medically, compiles a work upon the practice of medicine, relying largely upon a very wide and closely-followed hospital practice, the rest of the profession have a right to expect that the product which he puts before them will be different from and better than most, if not all, other books upon the same subject. The first of these expectations is fully realized, and it is a point open to discussion whether the chief differences, which we note in the earlier portions of the book, are innovations to be praised or lamented. It has been well said of this work that it is better for a practitioner, whose experience enables him to seek out the best which medical literature contains, than for the student who is not so well grounded in his art. Dr. Osler plunges into midstream on the first page of his text, with the subject of "Typhoid Fever," and has carefully excluded from the opening pages the general discussion of diagnosis, etiology, pathology, and symptomatology which generally form the introduction to works of so wide a scope. In other words, the very beginning of the book seems to expect that the reader has a general knowledge of medicine. The question as to whether the book is better than those which already have been a credit to American medicine is one which it is difficult to answer, and perhaps it would be invidious to attempt to do so. In many respects it may be regarded as the equal of the popular English work of Bristowe's, and it contains without doubt the latest and yet most careful opinions concerning our knowledge of disease. In a book, then, which we can so heartily recommend, it falls to the lot of the reviewer to call attention to the weak points rather than the strong, for an enumeration of the latter would cover many pages, while of the former we may say a few words.

In the article on typhoid fever, in discussing the subject of the use of cold, nothing is said about the importance of using frictions in the administration of the cold bath, although this is a point which every careful physician should most carefully regard. As Baruch has so well pointed out, frictions applied to the surface of the body are absolutely necessary for the avoidance of internal congestion, and for the reduction of the temperature, since by this means we bring the warm blood from the hot centres to the periphery.

In the article on diphtheria, under the head of treatment, Dr. Osler does not make clear the fact that the value of mercurials in the treatment of the disease exists only during the early stages, and the fact that he states that he has seldom seen them do good when administered in cases of diphtheria, would indicate that they have been used in the later stages. He fails to point out that the object of their administration is to decrease the formation of the fibrinous exudate, which forms the nidus in which the germs of diphtheria produce all toxic properties, which ultimately multiply and cause the systemic disturbance. Mercury is given under these circumstances for its antifibrinous effect, and not with the idea of exerting any general systemic influence over the poisons in the body. As is well known, mercury and similar powerful alteratives are always contraindicated in full doses, in the presence of asthenia or a disease process resulting in exhaustion and tissue break-down.

In the article on the "Treatment on Erysipelas," Dr. Osler doubts the value of the tincture of the chloride of iron in full doses. The experience of the vast majority of the profession, however, is so thoroughly in favor of the administration of this remedy that we cannot help feeling that his doubting its usefulness is unfortunate. This is a disease which so frequently occurs, and which can be so modified, at least so far as the symptoms are concerned, by active medical in-

terference, that we think it unfortunate that little is said concerning its treatment.

In the article on "Malarial Fever," on page 155, we are told that "from 10 to 30 grains of quinine, given in divided doses each day, will almost invariably stop the next malarial paroxysm," and from the context infer that this is Dr. Osler's opinion even in the presence of diurnal attacks. The most startling statement, however, is that no other treatment is necessary, and that no other drugs need be given. Certainly the accumulated experience of all physicians who treat malarial fevers is, that the efficiency of quinine is increased by the administration of cholagogues or remedies which increase hepatic or intestinal activity, and we have certainly seen cases in which full doses of quinine seemed to be without antimalarial effect, or even transitory influence, over the system, as long as constipation or apparent hepatic inactivity were present. We think, too, that physicians in the South will be disappointed in the fact that Dr. Osler practically gives the same treatment for all forms and varieties of malarial fever. Seven lines contain all that is said about the treatment of the pernicious forms, and less than a line is devoted to the mention of the use of iron and arsenic for malarial anæmia or other malarial affections.

We doubt, too, whether those who have had the most experience will regard with respect the statement that no other drug than quinine is necessary in the treatment of this disease. Surely the sulphite of sodium, mercurials, podophyllin, Warburg's tincture, and eucalyptus all may claim at least some minor point as adjuncts to quinine.

In the article on "Syphilis" nothing is said of the various plans of treatment which have been put forward by many syphilographers of the Anglo-Saxon or French school. Indeed, it would be practically impossible for any one to thoroughly treat an ordinary case of syphilis in the presence of the common complications, according to the treatment here given, with any success. Nothing is said about the importance of beginning with small doses of the protiodide or biniodide, and gradually increasing them, until by artificial immunity very large and effective doses are administered.

The directions for the treatment of catarrhal jaundice are almost slipshod in their looseness, and, we are told, off-hand, that "a dose of calomel may be given, and the bowels kept open subsequently by salines."

In the treatment of pneumonia, we find that Dr. Osler is almost a therapeutic nihilist, for he tell us that "pneumonia is a self-limited disease, which runs its course uninfluenced in any way by medicine, and that it can neither be aborted or cut short by any known means at our command." In support of this statement, Dr. Osler quotes a case which was admitted to his wards in the Philadelphia Hospital, in which absolutely no treatment was used, although the conditions in the early part of his illness were most unfavorable. While it is true that good nursing and a proper diet are of the utmost importance in the treatment of this disease, it is also a fact that, used at the proper time, the cardiac sedatives, which Dr. Osler doubts the value of, may be of use. This sentence in regard to the course of pneumonia being uninfluenced by medical procedures is contradicted by himself, in that he states that "timely venesection may save life."

We are glad to notice that he considers strychnine one of the most useful drugs at our disposal, but we are amazed that he should think that no certainty has as yet been reached as to the value of digitalis. If there is one remedy above all others which, combined with belladonna or strychnine, is useful in the second stage of pneumonia, assuredly digitalis is that one. It does not act favorably, however, when used alone when vaso-motor relaxation exists, which must be combated by belladonna.

In the article on "Epilepsy" we find nothing about the value of the nitrite of amyl for the aborting of epileptic attacks which are preceded by an aura sufficiently prolonged to permit of the inhalation of this relaxant, yet we are confident that epilepsy is a disease in which the repetition of the attacks means much to the patient, and that every attack that we can abort is a distinct advance towards an ultimate partial or complete cure of the case.

It is one of the misfortunes of medical literature that writers too frequently are so thoroughly versed in one department of their art that they are unable to write a book which covers other departments properly. While there is no doubt that in the pathological detail Dr. Osler is *facile princeps*, we should be very sorry to think that the articles upon treatment, which occur on the various pages of his book, represent the best therapeutics of to-day. Dr. Osler speaks *ex cathedra* about a subject in which he is confessedly careless and an unbeliever,—namely, therapeutics,—

and we cannot help feeling that this is the one fault of the entire work. The sins, however, are those of omission rather than commission, and perhaps it is well that in large works on the practice of medicine little should be said in regard to the treatment of the disease, since therapeutics has become so important a branch of the healing art that it requires special and complete volumes for its discussion and study.

Every sentence in Dr. Osler's book states a fact, and there is probably no work in which facts are stated more concisely. The style is not one which leads one on from paragraph to paragraph, but bears evidence of constant endeavor to concentrate the text into the smallest possible space.

Dr. Osler's book will be one to which the American medical profession may point with pride, but that it will be widely used as a text-book by students we seriously doubt. We are certain, however, that no one can scan its pages without benefit, and that he who practises medicine, except so far as treatment of disease is concerned, according to Osler's directions, cannot fail to be a successful practitioner.

A Treatise on Bright's Disease of the Kidneys: Its Pathology, Diagnosis, and Treatment, with Chapters on the Anatomy of the Kidney, Albuminuria, and the Urinary Secretion. By Henry B. Millard, M.A., M.D. Illustrated. Third edition, revised and enlarged.

New York: William Wood & Co., 1892.

Dr. Millard's book is well known to those members of the medical profession who are interested in the subject of renal disease (who is not interested in this important branch of medicine?), and the writer has been so well received as an author by the profession that three editions of his work have been called for within the last six and a half years. On looking over the third edition, which he tells us in his preface he has carefully revised, we are impressed with the fact that further experience has confirmed him in his belief as to the accuracy of his test for albumin, which is now known as Millard's test. This test, it will be remembered, consists of glacial carbolic acid (Merck's or Calvert's), two drachms; pure acetic acid, seven drachms, which are mixed, and then added to liquor potassa, twenty-two drachms. This should be filtered, and must be perfectly colorless, limpid, and acid. Another point of importance is the opening of the eighth chapter, in which the author makes the following announcement: "Since the appearance of the second edition of my book, six years ago, I have entirely renounced my belief in the so-called normal or physiological albuminuria. Constant new researches and experience by myself have shown me that the tests of Capitan and Chateaubourg, upon which I relied so much, were very defective, and I have been led to change my opinions entirely relative to the occurrence of albumin in health." He believes that those cases of albuminuria which are supposed to be physiological depend upon a want of absolute capacity upon the part of the experimenters to make examinations for albumina minima, to their not always employing the best tests and methods, and to their mistaking other substances for albumin; and, secondly, that when albumin is found in apparently healthy persons, there is too great readiness to assume that no pathological condition exists. The portion of the work which is devoted to therapeutics shows that the author is alive to the literature of the day; the only regret is that he is too much inclined to quote the prescriptions or methods of others, and the results obtained by them, and not to name those which he has used himself with advantage, even though they may not have been original. The book is printed in large type, and is very readable. We hope that it will continue in its popularity, for by its means the profession will obtain rational views concerning the relationship of the urine to the diseases of the kidneys.

Correspondence.

LONDON.

(From our Special Correspondent.)

Oxygen as a Therapeutic Agent—Asthma from Nasal Disease—A "Swallowed" Scarf-Pin—Thyroid Extract in Myxœdema—Treatment of Septic or Catarrhal Pharyngitis—"Current from the Main" in Medical Electricity—Some Dangers of washing out the Stomach—Pilocarpine in Labyrinthine Deafness—The Treatment of Diabetes—Dr. Wright's Physiological Styptic—Demonstration by Professor Politzer.

The therapeutic value of oxygen seems likely now to meet with a just, if tardy, recognition. In the beginning of the year a most interesting case was recorded by Drs. Brunton and Prickett, who succeeded, by giving inhalations of this gas, in temporarily restoring a patient, and prolonging his life for nearly two days, although at the time of commencing the inhalations he was almost *in articulo mortis* from pneumonia. The advantage of this treatment lay not only in the

actual prolongation of life, but also in the great improvement in the patient's comfort. Since the publication of this case hardly a week has gone by without the record of some similar successes. Dr. Foy says of the gas: "As a cardiac and respiratory stimulant, we possess nothing to equal oxygen, and it appears exactly to play the part of a physiological antidote to general anæsthetics. Why is it not more used?" Judging by the cases recently published, it seems unlikely that this question will have to be asked again. Indeed, on physiological grounds, one may fairly demand that oxygen should be at hand whenever chloroform anæsthesia is to be induced, as well as in cases in which dyspnœa is, or is likely to be, a prominent symptom.

Nasal troubles have before now been shown to bear a close causal relationship to asthma. Two cases recently noted by Dr. Drinkwater may be quoted as good instances of this. In one case, a young lady subject to very violent attacks of asthma, both nostrils were found to be filled with polypi. Removal of these with the cold snare completely cured the respiratory troubles. The second case, also a young girl of 23, had similar symptoms, and was found to have polypi in the right nostril, and hypertrophic rhinitis in the left. Removal of the polypi, and the application of the galvano-cautery to the hypertrophied mucous membrane, put an end to the attacks of asthma, which have not recurred. The inference is obvious, and serves to emphasize once more how thorough should be the examination by specialists of the body as a whole, even in cases of apparently local disease.

"Swallowing" a scarf-pin is not a frequent occurrence, but the following case shows how little inconvenience such a recurrence may cause. The patient, a boy of 13, let a scarf-pin slip down his throat, and it apparently became fixed in the lower part of his œsophagus. After a month, during a fit of coughing, the pin was ejected, accompanied with about a quarter of a pint of pus. The only thing complained of had been some slight cyanosis just after the swallowing, a little retro-sternal pain during the stay of the pin, and again slight cyanosis during the final ejection of the foreign body.

I have already reported, in previous letters, cases in which myxœdema has been successfully treated by means of injections of thyroid gland. I have now to add to this record another case, reported by Dr. Ernest Carter. The patient, an inmate of the Lancashire County Asylum, showed the characteristic symptoms of myxœdema, and no trace of a thyroid gland could be felt. Injections were given by glycerin extracts of pig's thyroid glands, prepared as described by Dr. Murray, and were followed by rapid improvement, so that after six injections the patient's demeanor was quiet, and the color and moisture of the skin were returning. In less than three months, says Dr. Carter, it would be well-nigh impossible to have said that the case had been one of myxœdema.

Throat troubles are particularly common at this time of year, and there is no doubt that the recent epidemic of influenza has left the naso-pharynx of many of its victims extremely susceptible to catarrhal affections. A treatment of catarrhal, or even "septic pharyngitis," which, in the hands of Mr. A. Nevins, has yielded very excellent results, is worth noticing. The patient's head being thrown backward, one of the nostrils is sprayed with the following lotion:

℞ Potassii chloratis, gr. iv;
Tinct. ferri chlor., ♏iv;
Aq. menthæ piperitæ, ℥i.

The liquid runs to the back of the pharynx, and, if the patient makes deep inhalations, some of the spray also passes down the larynx. In about half a minute an abundant secretion of viscid mucus takes place. The process is then repeated for the other nostril and the throat, with very great immediate relief of all the most distressing symptoms. The temperature also falls in a few hours, and the attack is very considerably shortened. Dr. Nevins recommends that the spraying should be repeated, at first at intervals of two hours, and afterwards less frequently. Every one knows the unpleasantness of a sore throat, so that, doubtless, many will try the above simple remedy.

To use "current from the main" has often been the desire of the medical electrician. Many of our houses are now supplied with electric-lighting currents, while batteries, as required for medical purposes, are both troublesome and expensive to maintain. Of course the great drawback to the use of currents from the main has been the danger of sudden influx of currents of much greater intensity than could be used with safety. Against this risk the ordinary electric-lighting fuse can hardly be said to afford sufficient safeguard. Dr. W. S. Hedley has recently, however, described a method by which such

currents can be employed with perfect safety. In the first place, he employs, not the full circuit, but a "shunt" circuit, which receives only a certain proportion of the possible maximum; secondly, to avoid influx of powerful currents, a "cut-out" is arranged, in the shape of a copper solenoid, working in mercury-cups, and pivoted on the centre. This solenoid is so arranged that, if the current should reach a predetermined maximum, it is deflected by means of an electro-magnet, the act of deflection shunting the current from the shunt circuit. Thirdly, Dr. Hedley introduces a series of movable resistances, so that the current is utilizable from the smallest fraction of a milliampère to any strength. The arrangement is manufactured by Messrs. Woodhouse & Rawson, London, and seems to act admirably.

Speaking at the Medical Society, Dr. Ralfe has recently discussed the respective indications of an exclusively nitrogenous diet and of opium in the treatment of diabetes. Some authors have recently recommended that an exclusively nitrogenous diet should not be too long insisted on in most cases, and it becomes important, therefore, to distinguish two varieties of diabetes,—alimentary (in which strict diet removes all symptoms), and constitutional (of which "pancreatic diabetes" is a form, and in which diet has only a limited effect). Carbohydrates have a distinctly more deleterious effect in the former than in the latter cases, but as in both forms a continuous restricted diet is very apt to lower the general tonus, it is well to prescribe as much as possible white meat, and to order also a course of massage. Dr. Ralfe would give opium whenever *régime* alone does not, after a time produce complete disappearance of sugar from the urine. He uses by preference either powdered opium or the bimeconate of morphine, giving it about an hour after meals.

Dr. Pavy, recognizing that in diabetes much of the trouble is due to defective assimilation of carbohydrates, considered that the end of all treatment should be to allow the organism to recover its lost power of assimilation. This may be best done by continuing a restricted diet for a long time, at the same time giving opium or its alkaloids; then, as soon as the assimilative power is restored, one should very cautiously allow quantities of carbohydrate (bread or fried potatoes, etc.).

Dr. Lauder Brunton, distinguishing between ordinary diabetes and gouty glycosuria, mentioned that in the latter condition he found salicylates of great benefit. As regards the use of morphine, it should never be prescribed when the urine gives the reaction of diacetic acid.

Readers will remember that in a previous letter I described a new physiological styptic, which had been discovered by Dr. A. E. Wright, and consisted of a solution of lime salts, together with fibrin ferment. At the time of writing that description, the application of this new styptic to human surgery had not been very extensive. It has now, however, been used in quite a number of operations to control hemorrhage, and I can say, from personal observation, with complete success, both as to the immediate effect in arresting the bleeding and in the absence of subsequent complications. Considering the ease with which the solution be prepared, little should now stand in the way of its more extensive employment.

Professor Politzer, of Vienna, during a visit to London last week, gave a most interesting demonstration of a number of anatomical and pathological specimens and instruments connected with aural surgery. Nearly all the chief otologists of London were present. Of the preparations shown, probably the most remarkable was a series showing the different normal aural structures. Some of these showed the membranous semicircular canals and utriculus in their normal relations; others showed the entire membranous labyrinth. Others showed the minute pathological changes occurring in certain cases around the stapes and the fenestra rotunda. Of the instruments shown, I may mention an ingenious vulcanite insufflator for blowing powders into the epitympanic cavity, and some elastic canulæ for syringing out the attic, and Prussak's space in obstinate cases of localized suppuration. Professor Politzer also referred to a method devised by him for showing the normal dilatation of the mouth of the Eustachian tube during swallowing. Taking a tuning-fork ($C^{3} = 512$ v. per second), and holding its vibrating ends in front of the nostrils of a person with normal hearing, the sound appears much longer during the act of swallowing, thus affording apparent proof that during this act the pharyngeal orifices of the Eustachian tubes are expanded. He proposes to utilize this fact to diagnosticate the presence of Eustachian obstruction in disease of the middle ear. It should also afford some idea of the progress of a given case under treatment.